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OF THE

PERTHSHIRE SOCIETY OF NATURAL SCIENCE.

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OF THE

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PRESENTED
5 NOV. 1903

PROCEEDINGS

OF THE

PERTHSHIRE SOCIETY OF NATURAL SCIENCE.

WINTER SESSION, 1898-99.

10th November, 1898.

HENRY COATES, F.R.S.E., President, in the Chair.

The President delivered the following Opening Address :—

GENTLEMEN,—During the months which have elapsed since the close of our last winter session the work of the Society has by no means been at a stand-still. In addition to the Summer Excursions, about which I shall speak presently, interest in the Society has been manifested in several other directions, one or two of which I shall now refer to briefly.

Early in the summer a movement was set on foot amongst a number of the amateur photographers in the city to form a new Photographic Society for Perth and Perthshire. Your Council, however, put themselves in communication with those who were taking a leading part in the movement, and were happily able to offer them such advantages, in the way of meeting-place, dark-room, etc., that they agreed to throw in their lot with us, instead of adding another to the already large number of educational and social organisations in our midst. The result has been, on the one hand, the resuscitation of our Photographic Section, with a large infusion of new and vigorous blood, and on the other hand a considerable accession to our membership. One practical outcome of this movement has been the planning of a Photographic Exhibition, to be held in the Sandeman Library, during the last week of January, 1899. Regarding this Exhibition I should like to make just two remarks. The first is to acknowledge the very cordial way in which the Lord Provost and his Committee met our proposal that it should be held in the Free Library, and to express the hope that this may be but the beginning of a career of friendly co-operation and mutual helpfulness between the two institutions, whose aims are so closely related to each other. The second remark I have to make in this

connection is to urge upon every member of the Photographic Section to send at least one print to the Exhibition, no matter how much his or her sense of modesty may dictate to the contrary. I know there is a strong feeling amongst some of our younger members, and amongst beginners generally, against placing their work in competition with that of more experienced photographers, but I think it would be a thousand pities if we left the whole, or nearly the whole, of our wall space to be taken up by competitors from a distance, although, of course, we welcome these very heartily as well.

Since our last General Meeting two of our members, who, at one time or another, have taken a prominent part in our proceedings, have been taken from us by death. The first of these is the late Dr. F. I. White, who died on Saturday, 8th October. Dr. White, although not often seen at our meetings, continued up to the very close of his long life to take a warm interest in the Society, and especially in the Museum, for which his distinguished son, our lamented President, had done so much. The other loss to which I refer is that of the late Dr. Archibald Campbell, who was a keen and well-informed geologist, and who was seldom absent from our excursions when anything of geological interest was to be sought for. Yet another member of our Society connected with the medical profession, namely, the late Dr. Simpson, has also passed away within the last few weeks.

Coming now to the affairs of the Museum, it is with much pleasure I have to announce that since our last meeting the two public bodies to whom applications were made for grants have responded in a most liberal and cordial manner. I refer to the County Council of Perthshire and the Town Council of Perth, both of whom have followed the example of the Perth School Board, and voted sums of twenty pounds each in recognition of the educational work being done by the Museum. These Grants afford great assistance and encouragement to us in the meantime, and we value them both as a public recognition of our work, and as an indication that ere long the Museum will be wholly supported out of the public funds.

During the past summer the attendance at the Museum has continued steadily to increase. In particular, there has been a very gratifying increase both in the attendance of school children, and in the interest which they take in the exhibits. One can hardly pass through the buildings on a Saturday afternoon or Wednesday evening without seeing one or more groups of children with pencil and note-book in hand, carefully reading the descriptive labels, or noting some feature of interest regarding the specimens. In this connection, I would remind the young people that their Essays must be sent to Mr. Ellison before 31st December next, and that in every case they must bear the name, address, age, school, and standard of the writer. I would also point out that the Competition is not confined to the Board Schools, but is open to children attending any school in Perth or Perthshire.

Amongst those who have visited the Museum during the past months are several scientific men from a distance, some of whom

were specially commissioned by other museums to inspect our cases and method of arrangement, and at least one important museum in the south has decided to adopt our plan.

SCIENCE TEACHING.

In watching the signs of the times, it is very gratifying to note the greatly increased importance which our public men and educational authorities attach to science as a leading factor in modern education. For instance, Lord Balfour, the Secretary of State for Scotland, in his recent important address at the opening of the new Grammar School at Paisley, said that, even in our elementary schools, "The claims of science have not received sufficient attention." One reason which he assigns for this is the heavy cost of the apparatus, &c., required for practical scientific teaching. The same idea is expressed, even more forcibly, in a circular issued by the Scotch Education Department, dated 19th August, and signed by Sir Henry Craik. Under the head of "Experimental Science," it recommends that, "In rural schools, and in summer, some investigation of plant life and of the elements of Botany should be added. In the third year at least three hours a week of practical work will be expected from each pupil." Still more striking, however, are the recommendations under the head of "Geography," which are:—"The reading of maps (*e.g.* of contour lines) and their construction; elementary exercises in surveying and mapping; a thorough regional survey, by means of excursions, of the physical geography, flora, fauna, and historical antiquities of the district in which the school is situated." These are entirely the lines on which our Society has always worked, namely, to encourage the investigation of the natural history of our own district, and it is certainly gratifying to see the principle recognised in so influential a quarter. At the same time, the Government have given additional encouragement to scientific education in Scotland by enacting that the Grants to which she is entitled under the Local Taxation Account Act of the present year shall be devoted to the higher grade science schools, and especially to Agricultural Education. They have also removed from the Grants available for Technical Education under the Act of 1890 the liability to deductions under the Infectious Diseases of Cattle Acts. The recognition of the value of scientific training, however, is advancing with even more rapid strides in the United States and in Canada, as will be seen from the report recently published by the Technical Instruction Committee of the city of Manchester, a copy of which Sir Robert Pullar has just placed in our Library for reference. One noticeable feature of this report is the importance which is attached in America to the establishment of Educational Museums in connection with Technical and Science Schools.

The only other reference I shall make to recent public utterances on this subject is to quote a memorable phrase from a speech which Lord Rosebery delivered at the opening of the People's Palace at Glasgow in January last. Speaking of the benefits of Free Libraries and Museums and public places of recreation, both to the inhabitants

of our cities, and to the corporations who administer them, he said that "The corporations of the United Kingdom are beginning to attend to the sanitation of the mind as well as of the body."

Before proceeding to give an account of the Excursions held during the past summer, it may not be inappropriate if I give a few notes on the

SEASONAL CONDITIONS

which have prevailed, and their effect on both plant and animal life.

In some respects it has been the most remarkable season experienced for many years. The winter had been open and mild, so that vegetation began to develop very early, and this premature growth was not, as is so often the case, checked by severe frosts in early spring. The same genial conditions, indeed, continued right on to the beginning of the summer season, with just sufficient rain in March and April to supply the needful moisture for plant life. The result of these conditions in the early part of the season was that vegetation, both arboreal and herbaceous, not only matured quickly, but was exceedingly luxuriant. The most casual observer must have noticed how abnormally heavy has been the foliage on our deciduous trees, and the farmer can bear testimony to the richness of the hay crop. The same holds true of all varieties of grass and of our ordinary wild flowers. So far as herbaceous plants are concerned, however, the season of extreme luxuriance was short-lived. From the beginning of May until the beginning of October hardly any rain fell, so that those plants which require pretty constant moisture soon began to fall off in richness. This was felt, of course, most in places where the soil was light and non-retentive, such as the the Atholl district of our Highlands, where the corn crop was much below the average. During the summer the heat was never very great, until about the middle of September, when a remarkable change took place, the temperature suddenly going up to an extent almost unprecedented at that season of the year, and accompanied, not by clear sunshine, but by conditions of excessive moisture. So completely, indeed, was the atmosphere saturated that in the country the stones and rocks, and in the town the pavements and buildings, remained wet all day, although there was no actual rain. Mr. Charles M'Intosh informs me that during the maximum of this "heat-wave," namely, on Sunday, 18th September, his thermometer at Inver registered 80 deg. F. in the shade and 132 deg. F. in the sun. These abnormal autumnal conditions, like those of the earlier part of the season, had a marked effect on vegetation. The potato crop, for instance, which had been singularly free from disease all summer, began to show signs of fungoid growth in several districts. The coniferous trees, too, at once showed signs of renewed vitality, the young larches forming quite an inch of new wood in the course of a few weeks.

The effect of the season on the foliage of our trees has been further made evident in regard to the autumn tints. These were very late of making their appearance, most of the trees retaining

BRITISH MUSEUM
NATURAL HIST

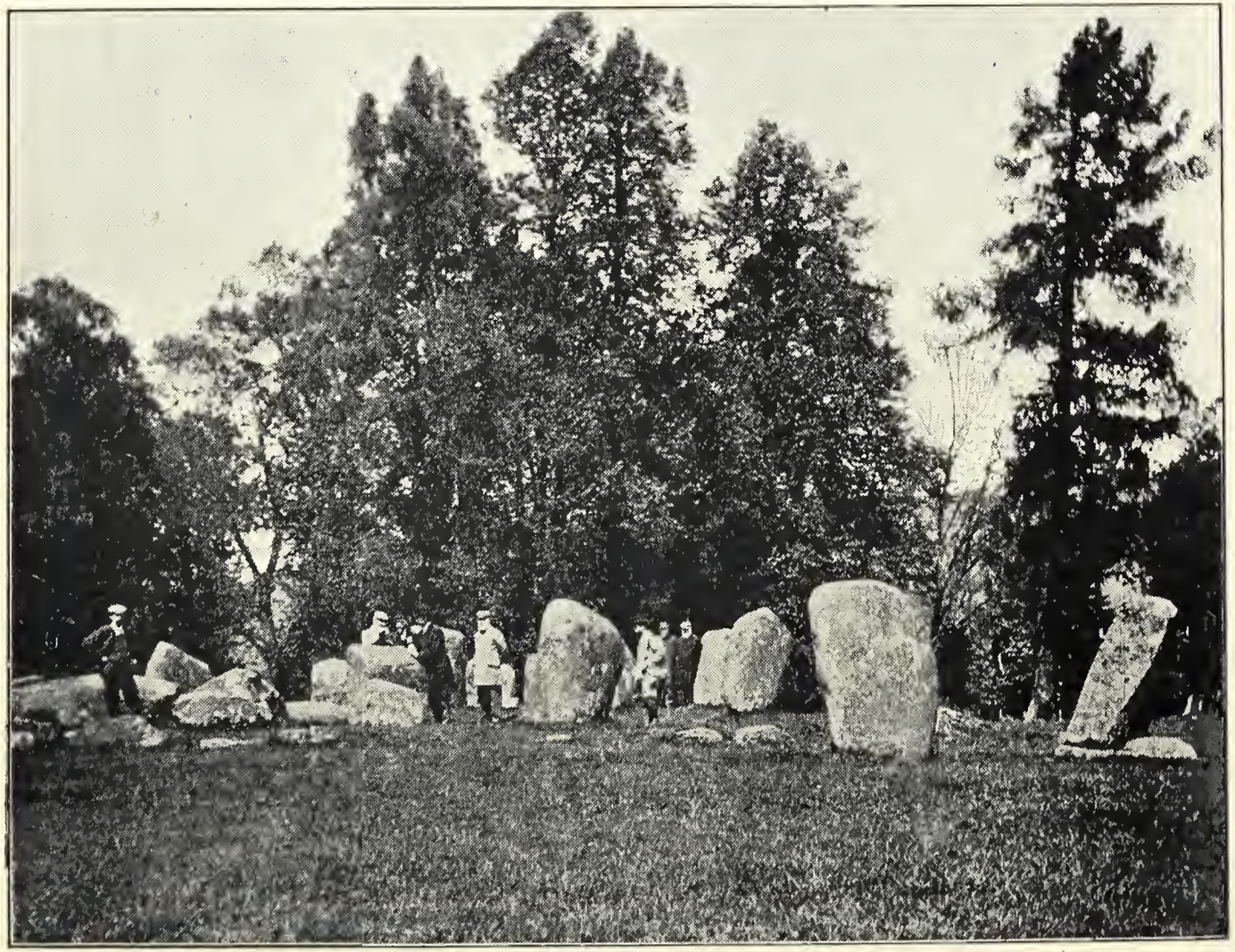


Plate 1.—Standing Stones near Taymouth.

their verdure till quite the middle of October, but when the change did take place the colours were exceptionally brilliant and varied. The reason of this probably was the excessive amount of sap which was allowed to rise in the trees owing to the favourable conditions in the early part of the season. The effects of the season on animal life are not, so far as I am aware, quite so apparent as those on plant life, though, doubtless, they must have been considerable. Insects, I believe, were hardly so abundant as usual, owing, probably, to the absence of any great heat during the summer months.

I now proceed to give a brief account of the

SUMMER EXCURSIONS OF 1898,

with the assistance of the reports furnished by the various leaders. From what I have said regarding the seasonal conditions, it will easily be understood that the weather was such as to render our outdoor work very enjoyable, and, at the same time, the conditions, particularly in the early summer, were exceptionally favourable for botanical research.

1. May 30 (Queen's Birthday), to Taymouth Castle. This excursion was arranged jointly with the Perth Architectural Association, but unfortunately the members of the latter were not able to be present. This was a matter for regret, as special facilities were given to us of viewing the architecture and decoration both of Taymouth Castle and of Castle Menzies. Colonel Campbell, who was the leader for the day, reports as follows:—"Through the courtesy of the Highland Railway Company, a comfortable saloon carriage was provided, which conveyed the party, numbering twenty members, to Aberfeldy, where a brake was in waiting to convey them to Taymouth. A halt was called on the way to examine the Druidical Circle on the left-hand side of the road, and there was much speculation amongst the archæological members as to its origin, and the purpose to which it was put. They then drove on to Taymouth, and, through the kindness of the Marquis of Breadalbane, were shown over the Castle by Mr. Dunn, the factor, and the housekeeper,—the hall, dining-room, and drawing-room being specially admired. After taking photographs of the Castle and its surroundings, from various points of view, the party walked through the beautiful grounds to Kenmore Gate, and visited the gardens, which were, as they always are, in perfect order. The carriage overtook them here, and they started on their homeward journey, driving along the base of Drummond Hill, where numerous vestiges of the disastrous gale of 1894 were still apparent. The route lay over the new bridge across the Lyon, and thence to Castle Menzies—Sir Robert Menzies having kindly invited the members to visit the ancestral house. The party went over the fine old house, admired the sycamore and other magnificent trees in the park, and then drove on to Aberfeldy, returning to Perth in the same luxurious saloon which had brought them north. The Excursion altogether was a thoroughly enjoyable one, the weather being all that could be desired, and the

scenery, in driving both to and from Loch Tay, very beautiful. As so much ground had to be covered, there was not much opportunity for any detailed scientific work, but the photographic members could not complain, as they had ample opportunity of reproducing, on plate or film, the beautiful country they had visited. As regards insect life, Mr. T. M. M'Gregor reports that "The lepidoptera captured was represented by a single specimen of the large common yellow underwing moth. An interesting example of protective resemblance was met with among the stones at the Druidical Circle, where a bug (*Globiceps dispar*, Boh.) was found, which closely resembles the ants (*Myrmica ruginodis*) with which it was associated."

2. June 11, to Dollar Glen. This was a joint excursion with the Scottish Natural History Society and we had again, as in former years, much pleasure in meeting with our friends from Edinburgh, and in partaking of their kind hospitality at the close of the day's work. The day, by the bye, began with a series of misadventures, which were only overcome by enthusiasm in the cause of science, backed by a dogged determination not to be beaten. We did at last reach our destination in safety, but only after a series of unforeseen changes from one mode of transport to another. On reaching the glen itself, the photographers at least were amply repaid for the delays and anxieties of the journey. Many most picturesque "bits" are to be found, both in the upper and lower reaches of the glen. For the botanists, Mr. Barclay speaks as follows:—

"Though there is a rich vegetation in the glen, the species which call for special remark are few, and have been noticed in the report of an excursion which was held in 1893. One wall of the castle was thickly clad with *Parietaria officinalis*, a plant often found in similar circumstances, though almost entirely absent from Perthshire. On the high ground at the top of the glen occurred *Viola lutea*, var. *amœna*, and a very pink variety of *Antennaria dioica*."

3. June 25, to Kinfauns and Elcho Castle. This was a half-day excursion and was consequently joined by some members who could not otherwise have been present. It would perhaps be wise if rather more of these short excursions were arranged, particularly as railway facilities are now so great on Saturday afternoons. Mr. Menzies, who was the leader, reports on the botanical results as follows:—

"The party, which numbered sixteen ladies and gentlemen, proceeded by way of Kinfauns to Elcho Castle. A number of interesting plants were observed along the bank of the river, amongst the rarer being *Epipactis latifolia* and *Ophioglossum vulgatum*. Several Carices were also found, including *Carex aquatilis*. The members belonging to the Photographic Section took a number of views by the river, and at the Castle. A fine yew tree,—"Wallace's Yew,"—said to have been planted by the great patriot, was visited, and a photograph taken of it for the museum tree case."

4. July 2, to Beinn Dheiceach (3074 feet). This was a mountain excursion, under the leadership of Mr. R. Brown, at whose request Mr. Barclay has reported on it as follows:—

"Proceeding by rail to Luib, the party, which was not very large, set off for the mountain, which attains a height of 3074 feet. The distance was about five miles and the way, though not particularly steep, was very rough and fatiguing. The day was fine, and though heavy showers were seen descending on the surrounding hills, the party were fortunate enough to experience none of them. After a pretty stiff climb, the top was reached about half-past two. Here a meeting of the Mountain Club, the first for several years, was held, and one new member, Mr. James Stewart, was initiated with the usual ceremonies. Mr. William Barclay was appointed Cairn Master in room of the late Dr. Buchanan White, and Mr. S. T. Ellison was elected to the important office of Quaigh Bearer. The Cairn Master proposed a toast—'The memory of the late Cairn Master, Dr. Buchanan White, who had led them to so many mountain tops in Perthshire.' This was drunk in solemn silence. The party then proceeded to explore the most likely parts of the mountain. Most of the Alpines common to the Breadalbane hills were got, but none of the rarer ones were seen. Amongst those obtained may be mentioned *Juncus triglumis*, *Luzula spicata*, *Carex capillaris*, *Sedum rhodiola*, *Potentilla Sibbaldi*, *Tofieldia palustris*, *Carex pauciflora*, *Oxyria renifornis*, *Arctostaphyllos uva-ursi*, *Silene acaulis*, *Vaccinium uliginosum*, *Salix arbuscula*, and *Salix Lapponum*. The best find of the day was a very rare moss, *Aulocomnium turgidum*, which was gathered by Mr. Meldrum. The plants were found to be very late this season, many being only in flower which are usually in fruit at this time. Few insects were on the wing, and consequently the entomologists were not very successful. From the summit a splendid view was obtained of the chief mountains and valleys of south-western Perthshire. Bright sunshine, with moving clouds, produced some splendid effects, which were greatly admired. Altogether a very enjoyable day was spent."

5. July 16, to the Den of Reichip and Loch Ordie. This excursion was to ground new to the Society, and new also to most of the members present. The party, numbering fifteen in all, was under the leadership of Mr. Keir, jun., Ladywell. Going by the morning train from Perth, the rest of the journey was by brake, with frequent intervals of walking over the more interesting portions of the ground. After driving round the end of Loch Craiglush and along the shore of Butterston Loch the foot of Reichip Den was reached, and here the party alighted to explore the Den on foot, while the carriage went on to the top of the hill. The beauty of the Den, with its steep and richly wooded sides, its thick carpeting of ferns, grasses, and flowers under foot, and the brown stream rushing over its rocky bed, was a surprise to most of those present. As the day's programme was rather a long one, there was not much time for the botanists to make a very detailed examination of the flora, but some interesting shade-loving plants were observed. Amongst the grasses, for instance, the rather scarce *Festuca sylvatica* was conspicuous, hanging in graceful tufts from the damp rocks. Amongst the ferns the most noticeable feature was the large number of species which were observed

within a comparatively limited area, the rarest, and one of the most beautiful, being *Asplenium viride*, which grew very luxuriantly. The next halt was made at Loch Ordie, a tarn about half-a-mile in length, occupying a rock basin in the midst of pine and heather-clad hills. Here a considerable time was spent exploring the water with hand-dredge and net from a boat, kindly placed at our disposal by the Duke of Atholl. Several species of Potamogeton and other aquatic plants were brought up, but none of special rarity, although it was of interest to the botanists to add a new locality for these. Some fresh-water Mollusca were also got, and some aquatic insects, amongst the former being *Physa fontinalis* and *Planorbis alba*. In driving back to Dunkeld the route taken was over the beautifully wooded shoulder of Craig-y-Barns and past Loch Cally, which is, I think, the most charming little loch in Perthshire. In the wood some very fine old Junipers, of unusual dimensions, were admired and photographed. Altogether the day was a most enjoyable one, the weather being perfect for such an excursion.

6. July 30, to the Sma' Glen. This was a joint-excursion with the British Medical Association, who were holding their annual gathering in Edinburgh, and it was arranged more with the object of acting as local guides to the visitors than for practical work. There was not, indeed, much time for the latter. Going by train to Dunkeld, we there joined the party from Edinburgh, and drove in brakes by Strathbraan, Amulree, the Sma' Glen, and Monzie to Crieff, where Dr. Meikle had invited the united party to dine with him at the Strathearn Hydropathic. It will be evident from this programme that there was not much opportunity for scientific investigation, but at the same time we had an enjoyable drive, enlivened by pleasant intercourse with our medical confreres from the south.

7. August 13, to the East Neuk of Fife, from Crail to Elie. This excursion was held in conjunction with the Perth Literary and Antiquarian Society, and was very well attended. The leader for the day was Dr. Urquhart, to whom, as well as to Mrs. Urquhart, and to Mr. and Mrs. R. D. Pullar, the members were greatly indebted for their kind hospitality on reaching Elie. Indeed, I feel sure that all who took part in this excursion will agree with me that it was one of the most enjoyable that has been held, and that they will long look back to it with pleasure. Mr. Barclay has prepared the following interesting account of the day's proceedings:—"There were nineteen ladies and gentlemen present. The Photographic Section was well represented, and its members found ample employment during the day amongst the quaint old towns which were visited. After a somewhat tedious railway journey by Dundee and St. Andrews, the party arrived at Crail about mid-day. Here they were met by Dr. Urquhart, who acted as leader during the day, and who at each place visited gave a most lucid and interesting account of whatever made it noteworthy in the eyes of the architect, the historian, or the antiquary. A visit was first paid to the old church. Here the Rev. Mr. Reid kindly conducted the party through the building and pointed out its

special features. It has been greatly disfigured by the rebuilding and heightening of the walls of the aisles, and by the putting on of a modern roof, which covers up the old clerestory windows, although these can still be seen from the inside. A church seems to have existed here since the time of David I., but Messrs. M'Gibbon and Ross are of opinion that the present building, with its tower and spire, belongs to the early part of the sixteenth century, and is a fine example of that period. From its pulpit Knox thundered forth one of those sermons against the idolatry of the Romish Church, which had already in Perth and St. Andrews roused the people to the destruction of images, altars, and in many instances to the pulling down of the buildings which contained them. Sharp also was minister of Crail before he was raised to the See of St. Andrews. Mr. Reid also pointed out some of the more interesting tombstones of the old churchyard, the two which attracted most attention being those of Bruce of Sunburgh and James Lumsden of Airdrie. The party then drove out to Balcomie Castle. Of this the chief portions which remain are the keep and the entrance gateway. Dr. Urquhart called special attention to the fine carved work above the latter. It consists of three escutcheons, two of them representing the arms of James Learmonth of Balcomie, with the motto of the family, '*sans feintise*,' and the other the arms and initials of Elizabeth Myreton of Randerston, the wife of James Learmonth of Balcomie, with the motto of her family, 'Advysedlie.' On the frieze along the top is the inscription, 'Except the Lord bild the house, they labour in vaine that bild it.' In one corner is a dial-stone, a frequent feature of the building of the period. The date inscribed on the work is 1660. Returning to Crail, the party walked through the town as far as the harbour and then drove to Anstruther. The day was bright and warm, and on the way a fine view was obtained of the Firth. In the foreground the Isle of May and the Bass stood out clearly, while behind, the long stretch of coast from Berwick Law to St. Abb's Head was plainly though more dimly visible. The fields on each side of the road were waving with fine crops fast ripening for the harvest, and it was easy to see that here a fertile soil and skilful cultivation were both conjoined. Passing through Anstruther, Easter and Wester, they proceeded to the ancient borough of Pittenweem, graphically, if not very accurately, described in the old election ballad—

> In Scotland stands an ancient brugh, wi' some twal hunder people,
> A lang and narrow stripe o' street, and ae high shouldered steeple;
> Ilk grocer i' the brugh is a Bailie, or has been,
> But the Provost was perpetual, and drove the haill machine.

Here a short halt was made to inspect the few fragments that remain of the old monastery. The church also, with its high shouldered steeple, was noticed, the latter still presenting much the same appearance as when it was erected in 1588. Resuming their journey, they passed on through the 'lang and narrow stripe o' street,' and then went on to Kelly Castle. Here they were received by Mr. Lorimer, who most kindly conducted them through the building. The oldest part is the great square turretted keep at the north-west corner. This,

Mr. Lorimer said, ought to be specially interesting to visitors from Perth, as it was built, at some unknown date, by one of the Oliphants of Aberdalgie, to which family the estate then belonged. It passed into the hands of a younger branch of the same family, and from them was purchased by the Earl of Kellie about the beginning of the 17th century. The more modern portion, which dates from about 1670, was erected chiefly by the third Earl. The beautiful plaster work of the ceilings of this portion was greatly admired. It is supposed to have been executed by Italian workmen. After a short stroll through the fine old-fashioned garden, and a few minutes spent in surveying the splendid view from the open ground in front of the castle, the party proceeded to St. Monance to inspect the fine old church. This building is said to have been built by David II. and his Queen in 1369, in testimony of their gratitude for having escaped safely from shipwreck on the adjoining coast. Messrs. Macgibbon and Ross, however, say that, judging from the architectural features of the building and the spire, the present structure probably belongs to the beginning of the 16th century. In that case, it probably replaced an older building. One section of the party now drove on by road to Elie, while the others enjoyed a pleasant walk along the coast, stopping on the way to visit the ruins of Newark House, which belonged to the famous David Leslie, afterwards Lord Newark, the conqueror of Montrose at Philiphaugh, and the only leader whom Cromwell found very much trouble in beating. There was not much time for botanizing. Only a glance could be given to the plants on each side of the footpath. Close to St. Monance Church were large patches of *Senebiera coronopus*, a sort of casual among rubbish, and which has been very seldom found in Perthshire. Arrived at Elie, the party were again united in the house presently occupied by Dr. Urquhart, where they were received by Mrs. Urquhart and very kindly entertained to tea and other refreshments. Here, also, they were met and welcomed by Mr. and Mrs. Rufus D. Pullar, and it should be mentioned that the latter gentleman very generously defrayed the expense of the drive from Crail. On the way home, it was unanimously agreed that the excursion was one of the finest and most enjoyable which the Societies have ever had."

8. August 25, from Newburgh, by Ballinbreich, to Balmerino. This, the concluding excursion for the season, which was partly botanical, partly antiquarian, and partly photographic, was under the excellent leadership of Col. Campbell, who has furnished the following particulars:—"Leaving Perth by the 9.50 train, the party, numbering ten ladies and gentlemen, went to Newburgh, where they found a brake awaiting them in which they drove through—literally "through," for the road intersects them—the fine old ruins of Lindores, which, though now merely a wreck, show in their decay what a magnificent pile the Abbey must have been. They then proceeded four miles to the old Castle of Ballinbreich, where a halt was called, and the party proceeded to visit the ruins. It is built on an eminence overlooking the Tay, and about a hundred yards from the river. It consists of a big square, protected on the south by a semi-circular

tower, in which loop-holes for musketry are pierced. On this side also are the remains of what was apparently a Chapel, but as all the stairs had fallen down, and many of the windows had been built up,—a great part of the material having also been utilised to build a surrounding wall,—it was difficult to make out the original plan of the building. Several photographs were taken, and the party then proceeded on their way through the beautiful policies of Birkhill to Balmerino, where, through the kindness of Col. Stuart Gray, the Abbey was thrown open for inspection. The Cloisters are the only parts of the building which now remain, and even they, though still very beautiful, have been sadly mutilated by former proprietors. The Rev. Dr. Campbell, an enthusiastic antiquarian, joined the party, and gave a most interesting account of the Abbey and its history, showing more especially the exact position of the Church, the site of which is now overgrown with trees. By making excavations, he has been enabled to localise the west and east ends of the church, the foundations of the south wall, and also of the pillars which sustained the central tower. He also pointed out three magnificent trees,—a sweet chestnut, a walnut, and a beech,—the latter said to be the finest in Fife. These trees are evidently coeval with the Monastery. The original intention was to drive on to Wormit and to return by Dundee, but, as the majority of the party preferred the drive, it was decided to go home by Newburgh. The drive back was pleasant, and, after having tea at Newburgh, the party returned to Perth at 6.30, having spent a most enjoyable day." Miss M. Thomas has kindly furnished the following particulars of the botanical specimens collected on this excursion:—"By the bank of the Tay, several interesting plants were observed, including *Aster tripolium*, *Triglochin maritimum*, *Scirpus maritimus*, *S. lacustris*, and *Œnanthe crocata*. Amongst the ruins of the Abbey, *Parietaria officinalis* was found growing in great abundance."

Before leaving the subject of the Summer Excursions, I may mention that the Cryptogamic Society of Scotland, which was founded by the late Dr. Buchanan White, held its Twenty-fourth Annual Conference this summer in our county, namely at Dunkeld, on the 20th, 21st, and 22nd of September. Unfortunately, the meeting does not seem to have been made known to our members, otherwise some of our botanists would doubtless have been present, but our Society was ably represented by Mr. Charles M'Intosh, of Inver, who acted as local guide for the excursions. Mr. M'Intosh informs me that Fungi were rather scarce, owing to the dryness of the season. The most notable find was *Sparassis crispa*, Fr., a yellowish spongy fungus, found growing amongst the pine needles at the foot of old fir trees around Inver, and at the mouth of Strathbraan. Careful search was made in Murthly Wood for *Hydnum imbricatum*, Linn., and *Agaricus (Pholiota) aureus*, Matt., which had been found in that locality in former years, but no trace of them could be found. Some of you may remember that a golden mass of the last-named fungus formed a conspicuous feature at the Fungus Show held at Perth, in October, 1875.

In connection with the "unofficial" excursions of the past summer, I should also mention the natural history rambles which Mr. T. M. M'Gregor organised for the Boys' Brigade during their week in Camp at Ballinluig, last June. Each evening, when the party returned from an expedition among the "Dead-Waters," to the hill across the river, or the more distant Ben-y-Vrachie, the Camp was all excitement to see the bottles and glass-topped boxes containing the captures, and to learn whether anything new or rare had been found. Indeed, we got so accustomed to novelties that we were quite disappointed when there was nothing "new to Perthshire" to report. Mr. M'Gregor, however, did not confine his labours to field work, for one hopelessly wet afternoon the whole company assembled in the marquee and listened to a most interesting lecture from him on "Insect Life," illustrated by specimens and black-board drawings. Mr. M'Gregor has kindly furnished me with the following note on some of the results of these rambles:—"One noticeable feature was the scarcity of *imagos*, especially in the case of dragonflies and bugs. Insects which in former years swarmed in the locality were this year conspicuous by their absence, and even the immature insects were not plentiful. Aquatic, sub-aquatic, and even terrestrial species were all in the same backward state. Some very fine dragonfly nymphs were collected, however, and these will eventually find a place in our museum. A very fine series of longicorn beetles, also, were obtained by sweeping among the raspberry canes. On the whole, although a number of interesting insects were got, the results, from an entomological point of view, were rather disappointing."

The following paper was read:—

"A revision of the Aquatic and Sub-aquatic Rhynchota of Perthshire." By G. W. Kirkaldy, F.E.S., and T. M. M'Gregor, F.E.S. (See *Trans.*, Vol. III., Part I., page 1.)

8th December, 1898.

HENRY COATES, F.R.S.E., President, in the Chair.

There was exhibited a turnip which had germinated through the nail hole of a roofing slate, and had swelled out on each side of the hole. It was sent by Mr. William Davie, Dunkeld.

The following papers were read:—

1. "Rare Flowering Plants of the Carse of Gowrie." By R. Dow, Longforgan.

2. "The Flora of Durdie and Arnbathie." By James Menzies. (See *Trans.*, Vol. III., Part I., page 6.)

12th January, 1899.

HENRY COATES, F.R.S.E., President, in the Chair.

There was exhibited a Photograph of the Moon, taken by Mr. George Young, 8 Kinnaird Bank, Craigie.

There was also exhibited a series of skeletons prepared by Mr. Alex. M. Rodger for the Index Museum.

The following papers were read :—

1. "The Feathered Tenants of our Buildings." By Lieut.-Col. W. H. M. Duthie, R.A. (See *Trans.*, Vol. III., Part I., page 10.)

2. "On the Protection of Wild Birds in Perthshire." By Col. Campbell. (See *Trans.*, Vol. III., Part I., page 18.)

On the motion of Col. Campbell, it was agreed by the meeting to send out circulars to the Proprietors of the County, and to others interested in the matter, calling attention to the Order in Council recently issued by Lord Balfour of Burleigh, the Secretary of State for Scotland, regarding the protection of wild birds and their eggs in Scotland.

9th February, 1899.

HENRY COATES, F.R.S.E., President, in the Chair.

The following paper was read :—

"A Naturalist's Notes on the recent Voyage of the 'Blencathra' to the Arctic Regions." By William S. Bruce, F.R.S.G.S. Illustrated by a series of lantern slides. (See *Trans.*, Vol. III., Part. I., page 25.)

9th March, 1899.

THIRTY-SECOND ANNUAL MEETING.

HENRY COATES, F.R.S.E., President, in the Chair.

The following Reports were read and adopted :—

REPORT OF COUNCIL.

Your Council, in submitting their Thirty-Second Annual Report, can again congratulate the members on the flourishing condition of the Society.

Six meetings were held during the year, at which eight papers were read, in addition to the two usual Addresses of the President.

The attendance at the meetings continues to be very satisfactory, the average being 40. The largest attendance was 44, on 9th February, 1899, and the smallest 36, on 8th December, 1898.

There has been an addition to the Membership of 64 Ordinary and 7 Associate Members, being the largest number admitted in one session since 1881-82. The total membership has reached the highest figure yet attained, namely 410, including 2 Honorary Members, 353 Ordinary Members, 11 Corresponding Members, 39 Associate Members, and 5 Associates. This very satisfactory increase is in part due to the Photographic Section, which was last summer revived and enlarged. In order to meet the wants of the Section, the Council agreed to fit up a photographic dark room, and they are pleased to know that this privilege has been largely taken advantage of. Under the auspices of the Photographic Section, a very successful conversazione was held in the Sandeman Library, to which all the members of the Society and their friends were invited.

During the Summer, 8 excursions were held, and were well attended. At one of these, the Members of the Society had again the pleasure of meeting with the Members of the Scottish Natural History Society, from Edinburgh, and the Council are pleased to think that this is likely to become an annual event, as the Edinburgh Society is desirous of arranging another excursion for the coming summer. A very successful excursion was also held jointly with the Perth Literary and Antiquarian Society. The Council again wish to place on record their indebtedness to those gentlemen who gave the permission necessary for the carrying out of some of those excursions, and also to others who contributed to the enjoyment of those who took part in them.

The Society has again to mourn the loss by death of several of its members, amongst the number being one of its founders, namely, Mr. William Herd, whose face was so long familiar at our meetings and excursions.

The Children's Essay Competition for the Prizes offered by the President at last Annual Meeting has proved very successful. The results will be announced at a meeting of the competitors and friends, to be held in the Lecture Room in the course of a week or two. A course of educational lectures on Practical Geology has recently been organised, and has been well attended. The lecturer is Mr. James B. Corr, of Dundee, and he has found the Geological collections in the Museum very useful for demonstration purposes. The course has been to some extent in the nature of an experiment, but as the result is so encouraging it is hoped that it may be possible to organise a similar course on this or some other subject next winter.

The Council have had pleasure in granting the use of the Lecture Room, as in former years, to various local societies, chiefly for meetings of an educational nature.

The number of visitors to the Museum continues to show a satisfactory increase. The number during the past year was about 12,160, or an average of fully a thousand a month.

REPORT OF TREASURER.

(See Balance-Sheet, page xxxix.)

REPORT OF TREASURER OF MUSEUM FUND.

(See Balance-Sheet, page xl.)

REPORT OF CURATOR.

Perthshire Museum.—The additions to the collection of Perthshire Vertebrates have been numerous, considering how few known blanks there were in the cases. As I explained in a previous report, the skeleton of an animal conveys more to the student than does a stuffed specimen. It is desirable, therefore, that we should have a series of typical skeletons, and to the attainment of this a beginning has been made. The body of a Fox was sent to us for maceration, and this when cleaned will be mounted and placed alongside the carnivors, and will form a valuable and instructive addition. In course of time I shall introduce typical skeletons at the commencement of each order of the Perthshire birds and mammals. The body of a mute swan was given to us by Major Drummond-Hay. This has been prepared and mounted, and its skeleton is now in the case.

The storage of the reference collections of Perthshire Insects has received considerable attention. The cupboards underneath the bevelled cases on the north wall of the gallery I am converting into insect cabinets. By introducing a centre-board, two tiers of glass-topped boxes can be placed in each cupboard. The sides of the boxes are grooved and fit into corresponding fillets at the sides of the centre-board of the cupboard, giving us a minimum loss of space between each box. The system admits of the cases being interchanged throughout the whole series. Eighteen boxes are fitted into each cupboard, two of which are completed and contain the *Hymenoptera*, *Diptera*, and *Odonata* of Perthshire. These will be added to as time and funds will permit, so as to bring the other groups of insects into their proper places in the series, instead of, as at present, having them scattered, some here and others there, throughout the building. The thanks of the Society are due to Messrs. Kirkcaldy, M'Gregor, Lawson, Wilkie, Wylie, and Rodger for additions to the groups *Hemiptera*, *Coleoptera*, *Lepidoptera*, *Hymenoptera*, *Diptera*, *Odonata*.

Index Museum.—Three groups have received special attention, viz., the *Echinodermata*, *Crustacea*, and *Mollusca*. These groups are arranged systematically in the upright cases, Nos. 7, 8, 9, and 12. The specimens have been carefully chosen, so as to show the basis of classification, etc., in the limited space. The method adopted is one which I have mentioned on more than one occasion, namely, the tablet system. The advantage of this method is the ease with which labelling can be done, the way in which groups can be brought together, and yet each specimen retains its individuality.

The Society has been presented with a large number of valuable specimens during the year for the Index Museum, and our thanks are due to the many contributors who keep us in mind. For the list of donors, see Society's *Proceedings*.

Besides donations, the Society has acquired a considerable number of valuable additions by purchase, both of specimens and fittings. Besides the glass-topped boxes referred to for the insects, a number of small glass-topped boxes were acquired for the shell exhibition case. Tablets also, for the Index Museum, have been a considerable item of expense.

Several very beautiful and instructive series of models were purchased in the early part of the year. One series, numbering 23 models, illustrates the embryology of the chick. Another series of 8 models shows the modifications of the vertebrate brain, the following types being represented, viz., Sea-lamprey, Dog-fish, Salmon, Frog, Alligator, Pigeon, Rabbit, Dog.

A number of very beautiful dissections showing the blood system (the arterial system injected) have been also acquired. The series comprises such types as the Crayfish, Mussel, Snail, Fish, Snake, Tortoise, Lizard, Frog, Salamander, Birds, Guineapig.

A series of preparations showing the life history from the egg to the adult condition were also purchased. These include the Snail, Salamander, Frog, and Snake.

The number of visitors to the museum shows a steady increase, and the intelligent interest taken, particularly by the younger visitors, has been very noticeable. This is no doubt due in part to the interest aroused amongst school children by the museum essay competition. Visitors—March 10th, 1898, to March 9th, 1899—12,160.

In conclusion, all the collections under my charge are in good order, showing that the cases are damp-proof and well ventilated. The traces of damp found in the Perth bird cases, and referred to in a former report, have entirely disappeared.

REPORT OF LIBRARIAN.

During the past year a considerable number of new books have been added to the Library, both by gift and by purchase. Amongst these are 7 works for reference, 41 works for the lending department, besides periodicals, and the publications of other learned societies. With these additions the present accommodation for books is fully taken up, and it will be necessary to provide more shelving before adding further to the collection. The number of readers has shown a very satisfactory increase. The total number of works lent was 197, in addition to which the works of reference are constantly being consulted.

REPORT OF EDITOR.

The Sixth Part (completing Vol. II., New Series) of the *Transactions and Proceedings* has been published and issued to Members during the year. Copies of the Society's *Transactions and Proceedings* have been sent to 13 Institutions (British and Foreign), and in exchange we have received many valuable additions to the Library.

The following Office-Bearers were elected :—

President—Henry Coates, F.R.S.E.

Vice-Presidents—James Bridges, Alfred Brown, Dr. Andrew Thomson, F.R.S.E., F.C.S., F.I.C., James Morison.

Secretary—S. T. Ellison.

Treasurer—John Stewart.

Librarian—James Coates.

Editor—William Barclay.

Councillors—R. Brown, F.E., R.N., Col. Campbell, The Right Hon. The Earl of Mansfield, James Menzies.

Curator—Alex. M. Rodger.

The following papers were read :—

1. "The Larch Diseases." By Alex. Pitcaithley. (See *Trans.*, Vol. III., Part I., page 37.)

2. "A Note on Recent Researches into the Nervous System." By Dr. Urquhart. Illustrated by specimens shown under microscopes.

13th April, 1899.

HENRY COATES, F.R.S.E., President, in the Chair.

The following paper was read :—

"Seals and Fur Seals." By Alex. M. Rodger.

The President delivered the following Address :—

GENTLEMEN,—My first duty this evening, after thanking you for re-electing me your President for another year, is to congratulate you on the continued prosperity of the Society, as revealed in all the Reports which were read at the recent Annual Meeting. The statistics which these contained speak for themselves as regards membership, finance, &c., but I think our *Transactions* will also bear evidence that, as regards original scientific research, the Society has not been forgetful of its primary function. There are one or two matters with regard to the work of the past session to which I should like to refer very briefly before proceeding to the subject of my address.

It is now just about a year since the late Dr. Buchanan White's "Flora of Perthshire" was published by the Society. Of the total edition of five hundred which was printed, about one-half has been disposed of by subscription and sale, thus leaving a very considerable

stock still in the hands of the Society. I trust that the members will do what they can to make the work known, and to reduce the number of copies still remaining. It has been very favourably reviewed by all the leading scientific journals, most of which recognise in it a contribution to systematic botany of exceptional value. It is admittedly a book intended primarily for students, but it is at the same time a book which should give pleasure to all who take an intelligent interest in whatever pertains to our beautiful county.

As regards educational work, an experiment was made in having a short course of lectures on Practical Geology, by Mr. James B. Corr, of Dundee, the lectures taking the form of a tutorial class, and demonstration on the Geological Collections in the Museum. One object in having this class was to supply the want of occasional systematic teaching which has been felt since the University Extension Courses were discontinued some years ago. Encouraged by the success of the experiment, the Council have arranged for a similar course to be given next winter. Any members wishing to join the class should give in their names to the Secretary, or to Mr. Rodger, before the beginning of the winter session.

The Children's Competition, which I suggested in my last annual address, for an Essay on the Museum, has excited a large amount of interest among the young people, and has been a source of great interest to myself, as showing the way in which the Museum and Natural History generally are regarded by the children. As promised, I will now announce the results of the Competition, which are as follows. The Essays—forty-five in number—were examined by Mr. W. T. Calman, of University College, Dundee, who divided them into three sections, a Senior (ages 14 and over), a middle (age 13), and a Junior (age 12). The following are the names of the competitors to whom he has given the highest number of marks :—

I. Senior Section.

First Prize.—	James Keay, Sharp's Institution, Perth,	-	100 per cent.
Commended.—	Christina Cuthbert, Royal School, Dunkeld,		80 ,,
	Thomas Thomson, Public School, Blairgowrie,		80 ,,
	Peter S. Marnie, do. do.,		60 ,,

II. Middle Section.

First Prize.—	Malcolm M'Gillewie, Royal School, Dunkeld,		100 per cent.
Commended.—	Agnes Callum, Caledonian Rd. School, Perth,		70 ,,
	Marion Lonie, do.. do.,		60 ,,
	Bella Urquhart, do. do.,		60 ,,

III. Junior Section.

First Prize.—	Donald M'Gillewie, Royal School, Dunkeld,		100 per cent.
(equal)	John Thomson Keay, Craigie School, Perth,		100 ,,
Commended.—	Mina Crow, Caledonian Rd. School, Perth,		60 ,,
	David M'Intosh, do. do.,		60 ,,
	Robert Smith, do. do.,		60 ,,
	Maggie White, do. do.,		60 ,,
	John Young, do. do.,		60 ,,

The Prizes I hope to hand to the successful competitors at a special gathering of the young people within the next week or two.

Now, it may perhaps seem to some of you to be beneath the dignity of a society such as ours to organise a competition of this sort for school children, but I think that if you were to read the essays you would find that it had served a useful end. They nearly all bear evidence that the competitors have taken an intelligent interest in the collections, and that they have not regarded them as a heterogeneous assemblage of so-called "curiosities." The general plan of arrangement has been grasped with more clearness than I had anticipated, and in every case the distinction between the Perthshire Collections and the Type Collections has been emphasised. In several cases a considerable amount of originality has been displayed, showing that the writers have not been content merely to take the information conveyed by the labels, but have added the results of their own observation. One, for instance, in describing the specimens illustrating the development of the salmon, gives some interesting notes on the life-history of that fish. The same writer is surprised at not seeing any fallow deer in the Deer Case, forgetting that they are not indigenous in the county, and then goes on to describe the peculiarities of the rabbits in the Rodent Case, as compared with those which he has observed in the part of the county where he lives. One cannot help feeling that the habit of observation thus early acquired may some day lead to important results. With such tastes manifesting themselves in the rising generation, there is no fear of our Society lacking enthusiastic supporters in the future, when the present workers shall have passed away. Several of the essays contain sketch plans, showing the arrangement of the collections. Some of these, from the mistakes which they contain, have evidently been drawn from memory, but for this very reason they show that the writers must have thoroughly grasped the general scheme of arrangement. In conclusion, I think we may claim that this competition has proved what we have always maintained, namely, that a museum such as ours is a powerful educational factor in the community. It has brought out exactly the impressions produced on the children's minds, and has shown, not only how the Museum leads them to observe Nature for themselves with a new interest, but also how it helps them to acquire an orderly and systematic habit of thought.

The success which has attended this experiment is so encouraging that I shall be glad to repeat my offer, and to give prizes for another Essay Competition during the present year. The subject which I have chosen for this competition is "The Divisions of the Animal Kingdom, as illustrated in the Index Museum." The conditions will be the same as last year, namely, each essay must bear the name, address, age, and school of the writer, and must be handed either to Mr. Ellison, 56 South Methven Street, Perth, or to Mr. Rodger, at the Museum, before 31st December. I trust there will be even a larger number of competitors than last year.

The last of the special features of the work of the past session

to which I wish to refer is the Photographic Exhibition, which has suggested to me the subject of my address for this evening, namely,

GEOLOGY IN RELATION TO ART.

During the last few months the citizens of Perth have had the privilege of seeing no less than three pictorial exhibitions in the new Sandeman Library, namely, a loan collection of oil paintings by some of the most famous masters of both ancient and modern schools; secondly, our own exhibition of photographs; and, lastly, a small but representative collection of water-colour drawings from South Kensington. Now, if we leave out of account the figure subjects in these three exhibitions, and consider only the landscapes, some interesting reflections suggest themselves when we compare the work of the brush and the work of the camera with a critical eye to details of scientific accuracy. I am not concerned for the present with the question as to which produces the more pleasing or the more artistic picture, but merely which is the more true to Nature. At first sight it may seem obvious that the work of the camera must be the more accurate, being an exact transcript of nature, as regards form at least; but this is not necessarily so. In the first place, the camera is apt to give a wrong impression of proportion, especially of distant objects, because the angle which, say, a mountain at ten miles' distance, subtends in the camera is so very small as compared with that of a man at ten yards that the former becomes altogether dwarfed as compared with the latter. Then, again, the camera, although it does not make actual inaccuracies in form, very often fails to give due emphasis to important structural details in the landscape, either from defects of focus or from insufficient distinction of tone. One example from my own experience will serve to illustrate this. In various parts of the Tay Valley there are very well preserved remnants of the ancient river terraces, ranging up to over a hundred feet above the present level of the river. These terraces, to any one who knows where to look for them, are very clearly marked, and can be traced at intervals along the sides of the valley for many miles, but the moment the geologist points his camera at them they seem to shrink almost out of sight. This result is not due to the exaggerated imagination of the geologist, but to the inability of the camera to give a due sense of elevation, and to distinguish between the various delicate tints of green and russet which make up the colouring of the hillside. Both of these mechanical errors could, of course, be easily rectified by an intelligent painter who knew enough of geology to correctly interpret the phenomena before him. The position, therefore, which I wish to prove is this, that the artist has it in his power to interpret nature even more faithfully than the photographer, but that very frequently he fails to do so, for lack of a little elementary knowledge of natural science.

If we examine an historical collection of paintings, arranged chronologically, we shall see that lack of scientific accuracy is much more obvious in the earlier than in the more recent schools. Indeed,

the progress evinced is to a large extent contemporaneous with the progress of the science of geology itself, and one might go even further than this and point out that interest in the study of landscape as a thing of beauty in itself is a growth of comparatively recent times. Of course, there are very notable exceptions, but as a rule the earlier painters regarded landscape as merely an unimportant adjunct, or "filling," to their figure subjects, to be painted, not from life-model in the open field, but from certain preconceived and conventional ideas, within the four walls of the studio. This, as I have said, is changed now, but there is still a lingering feeling amongst many artists that attention to minor details of earth-structure is something beneath their notice, or, at least, that too much attention to such details would destroy the artistic value of their work. Now, I am not in any way arguing against the views of the "Impressionist" School of recent years. That is to say, I do not imply that features of the distant landscape should be reproduced with telescopic distinctness. By all means let them be veiled by all the atmospheric softening that Nature herself loves to draw over the landscape, and even let this be exaggerated in harmony with the most myoptic vision; but what I do insist upon is, that whatever details are portrayed, or even faintly indicated, should be true to Nature, and should not give even an impression of something which is utterly impossible.

I do not profess to be an art critic, and therefore it would be presumptuous on my part to single out any particular artist for adverse criticism. I may, however, from a purely geological point of view, be allowed to point out some of the technical errors into which artists frequently fall, and which might easily be obviated by a slight knowledge of earth-lore. For instance, the rocks which occur *in situ* in any particular locality are either sedimentary, metamorphic, or volcanic, and each of these has its own characteristic mode of out-crop, which can be detected by the trained eye at a glance. In the case of the first named, the lines of stratification must be strictly parallel, and the curves must all be harmonious with each other. In the case of metamorphic rocks, the "texture" of the surface will at once indicate the nature of the deposit. The peculiar gnarling, for instance, of the schistose rocks of the Trossachs gives the whole charm to the scenery of that district, and yet the effect is a very subtile one, which artists frequently fail to catch. With regard to volcanic rocks, the angle of the jointing is a constant and a very characteristic feature, and yet it is one with which liberties are very frequently taken by the artist. The same remarks apply, of course, to rocks in the foreground, as well as to the larger features of the landscape. Even the colour of the soil is a source of possible error if too much scope is given to the imagination. The soil is derived almost entirely from the disintegration of the rocks, and this is one reason why the colouring of Nature's own landscapes is invariably harmonious. I am afraid, however, the same cannot always be said of the landscapes of man's creation. Reverting again to the illustration of the ancient river terraces, it may be argued by the artist that these form an unpleasing feature in the landscape which requires to be idealised.

If he thinks so, by all means let him blur or conceal the offending straight line in any way he thinks best; but, until the river has learned to run up hill, do not let him convert it into a curving line, or one that will give an impression of varying altitude. To take only one more illustration, the effects of glaciation on our northern landscape are now universally recognised, but less than a century ago no one dreamed that this country had once been buried under a sheet of ice, some thousands of feet in thickness. The traces left by this mighty ice-plough are nearly everywhere visible, particularly in the Highlands, and yet how seldom do we see any suggestion of them on the walls of our picture galleries! Here again there are, of course, notable exceptions, amongst which I would mention, specially, the landscapes painted in our own county by the late Sir John Millais, and also those of John M'Whirter, R.A. To mention only two examples of the former, you must all remember one of the last scenes that he painted, namely, a winter scene on Kinnoull Hill, entitled, "Blow, Blow, thou Wintry Wind!" In this picture the rocks in the foreground showed unmistakable signs of glaciation, and the same remark applies to the more distant landscape in the Highland scene entitled, "Over the Hills and Far Away." With regard to M'Whirter, it is not to be wondered at that his landscapes are true to Nature, for he has made a special study of geology. Another notable example of a Scottish landscape painter who was a faithful student of Nature is the late Sam Bough, R.S.A. No matter how much his hills are dimmed by the mist, you always feel sure that the form and the texture are correct.

It may be said that a true artist will, in virtue of his artistic instinct, be true to Nature, even without any special scientific training. In reply to this I would say, in the first place, that unfortunately the results do not always bear out this contention, for many artists whose work is otherwise admirable fail to produce a landscape in accordance with the facts of Nature. In the second place, however, the kind of knowledge required is of such a special nature that it is not to be expected that it could come to the artist entirely by intuition, any more than any other part of the necessary technique of his art could so come to him. If even a Reynolds required to mix his colours "with brains," surely it is not too much to insist that the brains of those who aspire to be landscape painters should be instructed in the principles of landscape geology. Indeed, I would go further than this, and insist that courses of instruction in geology should be established in connection with all our great schools of art, from the Royal Academy and the Art Department at South Kensington, downwards. In all of these human anatomy is made an essential element in the instruction, and rightly so. But, if it is necessary to have an acquaintance with the skeleton or framework of the human body and with the muscles which clothe that framework, before we can correctly delineate the outward features of the "human form divine," surely it is at least as necessary to have some knowledge of the rocky framework of our earth, and of the superficial deposits which cover that framework, before we attempt to transcribe the features of the landscape. Even when the framework is completely concealed by verdure,

or hidden under a covering of snow, its influence should still make itself felt in the picture.

I have already referred to one whom we may in one sense claim as a local artist. I may, perhaps, be allowed to mention one other name in this connection, namely, that of our townsman, Mr. Cranstoun. It is now many years since Mr. Cranstoun spoke to me on the very subject which I am now bringing before you. He then told me that geology had long been a favourite study of his, and that he had found it of the greatest possible service to him in the prosecution of his art. I think that those who are familiar with Mr. Cranstoun's pictures will recognise the results of this training in the faithful rendering of details of rock structure. I believe I am safe in saying that scientific accuracy is more frequently to be met with in the Scottish School of painters than in any other. The reason for this probably is that modern geology took its rise largely in Scotland, fostered partly by the philosophical and enquiring tendency of the Scottish mind, and partly by the wonderful complexity and interest of the Scottish rocks.

The painter in oils or in water-colours, however, is not the only artist to whom a knowledge of geology is essential, or at least helpful. The poet, as well, if his word-paintings are to be true to Nature, should know something about the past history of our globe, and how its present features have had their origin. Most of you will remember an interesting address on the subject of Nature and Poetry which was delivered in this room about a dozen years ago by Dr. H. R. Mill at the close of his first course of lectures on Physiography. Since then a somewhat similar subject was the theme of an address by Sir Archibald Geikie at Oxford. Both of these writers bring out very clearly the errors into which many of our poets have fallen, from an insufficient knowledge of the facts of nature. What is more surprising still, however, is that some of our best poets, including Wordsworth, Scott, and Cowper, have affected to despise the knowledge which they did not possess. Very different was it with the two greatest poets of the present generation, Tennyson and Browning. Both of these, while not parading any special knowledge, yet make it evident, in all their allusions to Nature and natural phenomena, that they are thoroughly conversant with the most recent teachings of science on the subject. The remark which I made at the outset with regard to painting holds good also in the case of poetry, namely, that a gradual evolution has taken place in man's appreciation of the beauties of scenery. At first the interest of human affairs absorbed men's minds, but gradually they came to recognise that there were silent forces at work around them far more stupendous in their consequences than the puny movements which are controlled by man's will. From awe and wonder grew a feeling of admiration and delight, and thus in time the landscape, in all its wondrous variety of aspect, became a favourite theme of both the poet and the painter. In other words, the time came when the beauty of this earth appealed to men's imaginations as something to be enjoyed for its own sake.

Much has been written on the question as to whether a scientific knowledge of Nature tends to diminish our appreciation of her beauties. For my own part, I can only say that the more I know,

even in a very imperfect degree, the more I wonder and admire. I will even go a step further, and say that, the more I know, the more I reverence the Author of all. It has always seemed to me that those who affect to despise the study of Natural Science on the ground that it tends to disillusionise the imagination, are just those who have not the inclination or the ability to apply themselves to such study.

In conclusion, I would sum up my argument by stating that the artist, whether he be poet or painter, who would produce an artistic transcription of Nature must produce one which is free from inaccuracies of detail; and to be able to do this he must be possessed of a certain amount of scientific knowledge.

COURSE OF LECTURES ON GEOLOGY.

The Society engaged Mr. James B. Corr, Dundee, to deliver the following Geological Lectures, which were given in the Lecture Room of the Society, on Friday evenings at Eight, as under:—

1899.
Feb. 17—"Rock Fragments and what they Teach."
,, 24—"Geological Structure of the Earth's Crust."
Mar. 3—"The Geological Record and its Interpretation."
,, 10—"The Succession of Life on our Planet."
,, 17—"Rambles up the Tay Valley in Search of Minerals."
,, 24—"Geology of the Lower Basin of the Tay."

There were also two Excursions in connection with the course, one to Moncreiffe Hill and one to Dunkeld. These were well attended and greatly appreciated.

PHOTOGRAPHIC SECTION.

Report of Proceedings, 1898-99.

The Photographic Section has had a most remarkable and successful year. In May, 1898, a meeting was held in the city to form a Photographic Society for purely photographic purposes. Mr. Rodger attended on behalf of the P.S.N.S., and explained the advantages that were to be derived by joining the same. After some discussion, a Committee of the Meeting was appointed, and was instructed to approach the Council of the P.S.N.S., and to inquire as to the advisability of joining the latter body instead of forming a new society.

The Committee were so pleased with the friendly manner in which the Council met them, especially with the promise that a new darkroom would be fitted up for the Photographic Members, that they unanimously reported in favour of becoming Members of the Photographic Section of the P.S.N.S., as by this means greater advantages would be obtained than by the formation of a new association.

By this means some 40 members were added to the Society.

With regard to the Excursions of the Section, these were only poorly attended, probably owing to the Syllabus not being placed in the Members' hands until the end of June. However, negatives of value were obtained from Moncreiffe, Glenfarg, Almondbank, Crail, Kinfauns, and Dunkeld.

The Winter Meetings, it is pleasant to note, have been an unqualified success. Practical demonstrations, which have proved a boon, were given in Carbon Printing by Mr. A. S. Nicol, in Developing Negatives by Mr. Mercer, in Bromide Enlarging, &c., by Mr. Burrows, Lantern Slides by Mr. Kirk, &c. &c.

The chief feature of the winter's work has been the Photographic Exhibition, held in the Sandeman Public Library in January, which, though only intended to be open for 6 days, was, owing to a strong desire on the part of the public, kept open in all for 10 days. Some 500 pictures were sent in for competition, besides which there were on view notable pictures by W. M. Warneuke, J. Craig Annan, Geoffrey Millais, Sir Thomas Glen-Coats, Bart., as well as Local Photographers' Exhibits, and Manufacturers' Stalls. In addition to this, the Kromscop and Gramaphone were also provided for the amusement of the public. The Exhibition was opened with an address by the President, Mr. Henry Coates, and followed with a Lecture on the "Seasons," illustrated with Lantern Slides, by Mr. C. Reid, of Wishaw. The Committee are exceedingly grateful to those members who kindly guaranteed the expense of the Exhibition, and also to those who sent in pictures. To the co-operation of these classes the great success of the Exhibition was entirely due.

During the time the Exhibition was open it is estimated that some 7000 people visited it, and it is also instructive to note that most interest was centred in the Members' Classes.

The Members are greatly indebted to their President, Mr. Henry Coates, for the use of the Lantern, and also the the use of the Enlarging apparatus.

During the summer months Meetings were held for the exhibition and comparison of Members' work in prescribed subjects, as under:—

Wednesday, 7th June.—"Old Buildings in Perth."
,, 5th July.—"Tree Study."
,, 2nd August.—"On the North Inch."
,, 6th September.—"Study of Flowers."
,, 4th October.—"Study of Child or Group of Children."
,, 1st November.—"View on the Tay."

Office-Bearers of Photographic Section for Session 1898-99.

Honorary President—Henry Coates, F.R.S.E.

President—Dr. Andrew Thomson, F.R.S.E., F.C.S., F.I.C.

Vice-Presidents—J. Sime and A. Nicol.

Committee—Miss Jamieson, Miss Macnab, F. Fenwick, A. Davidson, S. Chapman, J. Aitchison, Alex. M. Rodger.

Joint-Secretaries—Col. Campbell and C. F. S. Burrows.

LIST OF DONATIONS TO THE MUSEUM AND LIBRARY,

From 1st April, 1898, to 31st March, 1899.

I. PERTHSHIRE COLLECTION.

Two Pearl Mussels (malformed) from River Tay—Mr Peter Bisset.
Horned Beetles, *Acanthocinus ædilis*, Male—Mr. James Irvin.
,, ,, ,, Larvæ—Mr. James Wilkie.
Nepa cineria, larvæ—Mr. G. W. Kirkaldy, London.
Coleoptera, a number of—Mr. T. M. M'Gregor.
Dragonflies, a number of, Larvæ—Mr. T. M. M'Gregor.
,, ,, Ballinluig—Mr. Alex. M. Rodger.
,, ,, Buchanty—Mr. Alex. M. Rodger.
Sirex gigas, Female—C. L. Wood, Esq., Freeland.
Lepidoptera, 6 species—Mr. Robert Lawson.
Hymenoptera, 65 specimens—Mr. William Wylie.
Coleoptera, 20 specimens—Mr. Wylie.
Wasps' Nest—Mr. Mitchell.
Diptera, 54 specimens—Mr. William Wylie.
Bee-Hawk Moths—Mr. C. T. M'Farlane, Cargill.
Peregrine Falcon, Female (adult plumage)—Mr. John M'Niven.
Pintail Duck, Male (adult plumage)—Col. Campbell.
Long-Tailed Tit—Mr. W. H. Herd.
Meadow Pipit—Miss Coates.
Stone Chat—Mr. John M'Donald.
Green-Crested Wren—C. L. Wood, Esq., Freeland.
Common Wren's Nest, built in Swallow's Nest—C. L. Wood, Esq., Freeland.
Slavonian Grebe—Mr. Robert Gloag.
Corn Bunting's Eggs—Mr. T. M'Farlane, Cargill.
Great Spotted Woodpecker—Sir E. S. Richardson, Pitfour.
Greyhen (partly male plumage)—Col. Campbell.
Gadwall, Male—H. Kelsall, Esq., Crieff.
Kingfisher—Mr. J. Wishart, Longforgan.
Curlew—Mr. Charles M'Intosh, Inver.
Hedgehog (pale variety)—Mr. James Keay, Murthly.
House Mouse (pale variety)—Mrs. Gourlay.
Fox—Mr. John Greig.
Red Field Vole (young)—Melville Jameson, Esq.
Fungi, A Series of Water Colour Drawings of Perthshire Forms—Miss Drummond Hay.

II. INDEX COLLECTION.

Sponges, several species, Japan—Mr. Alex. M. Rodger.
Corals, a number of—Mrs. T. Clark, Blairgowrie.
Echinoderms, several species, including a Stalked crinoid (*Metacrinus rotundus*) from Japan—Mr. Alex. M. Rodger.
Shells, numerous—Mrs. T. Clark, Blairgowrie.
Gryphea and a Pecten, Skye—Mr. W. M'Quibban.
Paper Nautilus, Pearly Nautilus, and other Shells, Japan—Mr. M. Rodger.
Crustacea, 14 species—Professor D'Arcy W. Thompson, C.B., Dundee.

Giant Crab *(Macrocheira Kæmpferi)* and other Arthropods, Japan—Mr. Alex. M. Rodger.
Branchipus eximus, Palestine—H. Crowther, Esq., Leeds.
Peripatus novæ zealandeæ—Dr. C. Chilton.
Lepidoptera, 4 species, English localities, Mr. W. Wylie.
Salmonidæ, 4 species, Howietown—Mr. P. D. Malloch.
Fish, 8 species, from Saigon, Japan, Kamchatka—Mr. Alex. M. Rodger.
Python, Assam—Mr. David Lornie.
Nest of Weaver-bird, Singapore—Mr. W. Duncan. Montrose.
Greenland Falcon, Davis Straits—Captain Grey, Dundee.
Two Puffins, Davis Straits—Captain Milne, Dundee.
Eggs of Snow Bunting, Little Auk, Red-throated Diver, Long-tailed Duck, Wild Duck, Davis Straits—Captain Milne, Dundee.
Birds' Feet, various—Mr. Charles Kirk, Glasgow.
Penguin, Wing of—Professor D'Arcy W. Thompson, C.B., Dundee.
Snowy Owl, Davis Straits—Captain Milne, Dundee.
Iceland Falcon, Davis Straits—Captain Milne, Dundee.
Horned Puffin, Bering Sea—Mr. Alex. M. Rodger.
Crested Puffin, Bering Sea—Mr. Alex. M. Rodger.
Little Auk, Bering Sea—Mr. Alex. M. Rodger.
Musk Ox, Giraffe, and Elephant (black and white drawings of)—Sidney Steel, Esq.
Sea Leopard, Skull of, Antarctic Ocean—R. Kinnes, Esq., Dundee.
Wild Cat, Skull of—Mr. A. M'Farlane, Kingussie.
Canadian Badger—Mr. Charles Kirk, Glasgow.
Gemsbok, Horns of, Africa—Mr. John M'Gregor.
Polar Bear, Skeleton of, East Greenland—Captain Robertson, Dundee.
,, Skull of, Davis Straits—Captain Grey, Dundee.
Fruit Bat—Mr. Charles Kirk, Glasgow.
Badger, Skull of—Mr. Charles Kirk, Glasgow.
Ram, Skull of Shropshire—Mr. T. Crawford.
Skeleton of Fur Seal *(Otaria ursina)* (young male), St. Paul's Island, Bering Sea—Mr. Alex. M. Rodger.
Skeleton of Fur Seal *(Otaria ursina)* (pup), St. Paul's Island, Bering Sea—Mr. Alex. M. Rodger.
Skin of Fur Seal *(Otaria ursina)* (pup), St. Paul's Island, Bering Sea—Mr. Alex. M. Rodger.
Skulls of Fur Seals *(Otaria ursina)* (pup, young male, and bull), St. Paul's Island, Bering Sea—Mr. Alex. M. Rodger.
Skeleton of Sea Otter *(Latax lutris)*, Copper Island, Bering Sea—Mr. Alex. M. Rodger.
Skull of Sea Otter *(Latax lutris)*, Copper Island, Bering Sea—Mr. Alex. M. Rodger.
Skull of Blue Fox *(Canis lagopus)*, Copper Island, Bering Sea—Mr. Alex. M. Rodger.
Skull of Sable *(Mustela zibellina)*, Kamchatka—Mr. Alex. Rodger.
Skulls of Brown Bears *(Ursus arctos)* (male and female), Kamchatka—Mr. Alex. M. Rodger.
Skull of Sea Lion *(Otaria stelleri)*, St. Paul's Island, Bering Sea—Mr. Alex. M. Rodger.
Laburnum, section of—Mr. Charles M'Intosh, Inver.
Elm, section of—H. Coates, Esq.
Fungi, number of—Mr. Charles M'Intosh, Inver.
Collection of Dried Plants, Copper Island, Bering Sea—Mr. Alex. M. Rodger.

III. LIBRARY.

Missouri Botanical Garden Annual Report, 1st to 9th year inclusive.

Geological Society, Quarterly Journal of the, 1826-1897 inclusive—Miss C. Moore, London.

Geographical Journal, 1861-1898 inclusive (some earlier parts wanting)—Miss C. Moore, London.

British Association, Transactions of the, 1846-1897 inclusive—Miss C. Moore, London.

Royal Society, Proceedings of the, 1868-1897 inclusive—Miss C. Moore, London.

Pollen, M. Pakenham Edgeworth—Charles M'Intosh.

Agriculture, Year Book of the U. S. A. Department of, 1897—Secretary of Agriculture, U.S.A.

Academy of Natural Science, Philadelphia, U.S.A., Proceedings of the, Parts I., II., and III., 1898.

Tailless Batrachians of Europe, G. A. Boulenger, F.R.S., Part II.—Ray Society.

Geographical Magazine, Scottish, 1897 and 1898—Andrew Coates, Esq.

Agriculture, Leaflets of the Board of, 41-53 inclusive, from Secretary of Board of Agriculture, London.

Watson's County and Vice-County Divisions of the British Isles, 1898, Framed Copy—Sir Robert Pullar.

Fishery Board of Scotland, Annual Reports of the, 14th, 15th, and 16th—Secretary to the Scottish Fishery Board, Edinburgh.

Agricultural Department, U.S.A., Bulletin No. 50, Composition of Maize—Secretary of the Board of Agriculture, Washington.

Museum of Natural History, American, Annual Report, 1897, from the Society.

Museum of Natural History, American, Bulletin of the, Vol. XI., Part I.

Manchester Technical Instruction Committee, Report of the—Sir Robert Pullar.

Sandeman Public Library Catalogue—Committee.

Proceedings of the Berwickshire Naturalists' Club, Vol. XVI., Part I., 1896.

Geological Survey of Canada, Annual Report, Vol. IX., 1896—Secretary to the Geological Survey of Canada.

Fleming's British Animals—Mr. John Stewart, L.D.S.

Agriculture, Preliminary Report of the U.S.A. Department of, 1898—The Department.

Forestry, Conditions of, North Wisconsin, Bulletin No. 1, Economic Series No. 1, from the U.S.A. Department of Forestry.

Solitary Wasps, Instinct and Habits of—G. W. and E. Peckham.

Transactions of the Natural History Society of Glasgow, Vol. V., Part II., 1897-98—The Society.

Nature, 1897, 1898, from R. Kidston, Esq.

Photograph, Taymouth Excursion Party, enlarged copy, Framed—H. Coates, Esq.

Bering Sea Fisheries, Parliamentary Blue Books—R. Wallace, Q.C., M.P.

Transactions of Wisconsin Academy of Science, Art, and Letters, Vol. XI.—The Society.

British Association, Report of the Meeting at Bristol, 1897—The British Association.

Royal Society, Edinburgh, Transactions of the, Vols. 36, 37, 38, and Part I., Vol. 39—Sir Robert Pullar.

Museum of Natural History, American, Bulletin of the, Vol. X.—The Museum.

Science Gossip, monthly—H. Coates, Esq.

The Amateur Photographer, weekly—presented by the Publishers.

ROLL OF MEMBERSHIP, AS AT 13TH APRIL, 1899.

* Original Members. † Life Members.

HONORARY MEMBER.

Geikie, James, LL.D., F.R.S., etc., Professor of Geology, Edinburgh University, ...	2nd February, 1882

CORRESPONDING MEMBERS.

Brebner, James, Harris Academy, Dundee, ...	1888
Ferguson, Rev. J., M.A., Fern, Brechin, ...	5th March, 1874
Geddes, Patrick, F.R.S.E., University College. Dundee,	3rd February, 1881
Goodchild, J. G., F.G.S., F.L.S., etc., Science and Art Museum, Edinburgh, ...	20th December, 1897
Macnair, P., 70 Eastwood Avenue, Shawlands, Glasgow,	13th November, 1890
Mill, Dr. H. R., F.R.S.E., 109 West End Lane, West Hampstead, London, S.W., ...	7th April, 1892
Ramsay, E. P., F.L.S., Curator of Australian Museum, Sydney, ...	7th February, 1884
Smith, Rev. Frederick, The Limes, Dunblane, ...	13th November, 1890
Thomson, Professor D'Arcy, C.B., University College, Dundee, ...	10th November, 1892
Trail, J. W. H., M.A., M.D., F.L.S., High Street, Old Aberdeen, ...	8th February, 1872
Wilson, Dr., Andrew, F.R.S.E., 110 Gilmore Place, Edinburgh, ...	4th January, 1883

ASSOCIATES.

Dewar, D., Remony, Kenmore, ...	5th February, 1885
Greig, Mr., Gamekeeper, Eastwood, Dunkeld, ...	14th April, 1898
Keay, James, Gamekeeper, Murthly, ...	9th March, 1899
Laidlaw, Mr., Gamekeeper, Castle Menzies, Glenlyon,	7th February, 1884
Macdonald, Mr., Gamekeeper, Rannoch Lodge, ...	7th February, 1884
M'Intosh, Charles, Inver, Dunkeld, ...	1st May, 1873

ORDINARY MEMBERS.

Aitchison, J., Rose Terrace, ...	8th December, 1898
Alexander, Charles, High Street, ...	16th January, 1896
Alexander, John, M.A., Sharp's Institution, ...	14th December, 1893
Alexander, J., Seedsman, New Scott Street, ...	6th April, 1897
Alexander, Rev. John, M.A., Pitcairn Manse, ...	24th November, 1895
Allan, Thomas, Insurance Agent, St. John Street, ...	13th April, 1899
Anderson, Andrew, c/o P. D. Malloch, New Scott Street,	9th December, 1897
Anderson, Rev. Dr., Manse, Forteviot, ...	2nd May, 1878
Asher, J., The Academy, ...	9th December, 1897

Bannerman, Rev. Dr., Free St. Leonard's Manse, ...	16th January, 1896
Barclay, William, Friar Street, Craigie, ...	1st February, 1883
Barclay, William A., Pitcullen Terrace, ...	9th December, 1897
Barker, D. M., Craigend, ...	5th May, 1887
Barker. Mrs. D. M., Craigend, ...	5th January, 1882
Barker, R., Albert Place, ...	8th December, 1898
Beattie, Dr., Pitlochry, ...	9th December, 1897
Bedford, F. W., British Linen Bank, George Street, ...	13th December, 1894
Benson, Mrs., Row, by Doune, ...	13th February, 1896
Bett, John, Birchwood, Birnam, ...	16th January, 1896
Blair, Douglas, South Methven Street, ...	10th March, 1898
Bouick, James B., *Dundee Advertiser* Office, High Street,	14th February, 1895
Boyd, Rev. John, 6 Charlotte Street, ...	13th April, 1899
Brady, George, 23 Melville Street, ...	11th April, 1895
Brand, John, Upland, Kinnoull, ...	10th December, 1891
Brand, Robert, Charlotte Place, ...	7th April, 1892
Breadalbane, Marquis of, Taymouth Castle, Aberfeldy.	7th April, 1892
Bridges, James, Tay Street, ...	1st February, 1883
Brown, Alfred, Seedsman, New Scott Street, ...	14th December, 1893
Brown, J. A. Harvie, F.Z.S., Dunipace House, Larbert,	10th December, 1891
Brown, Mrs., Laurel Bank, Barnhill, ...	9th May, 1889
Brown, Robert, F.E., R.N., Laurel Bank, Barnhill, ...	23rd January, 1883
Buchanan, P., c/o Messrs. Robertson & Dempster, Methven Street, ...	12th January, 1899
*Buist, Dr., Atholl Crescent, ...	28th February, 1867
Buist, Mrs., Atholl Crescent, ...	13th February, 1896
Buist, Miss, Atholl Crescent, ...	13th February, 1896
Burnett, C., Craigmount, Barnhill, ...	22nd February, 1894
Burrows, C. F. S., 38 Victoria Street, ...	8th December, 1898
Burton, Miss, Blackfriars House, ...	3rd January, 1878
Buttar, Thomas, 8 Marshall Place, ...	8th March, 1894
Calman, W. T., B.Sc., University College, Dundee, ...	11th April, 1894
Cameron, David, Commercial Street, Bridgend, ...	14th December, 1884
Cameron, Miss, South William Street, ...	14th November, 1895
Campbell, Col., Governor General Prison, ...	18th January, 1884
Campbell, Edward, Lignwood, New Scone, ...	11th April, 1889
Campbell, John, Optician, George Street, ...	3rd February, 1881
Campbell, J. V., Measurer, South Methven Street, ...	12th January, 1899
Campbell, Peter, Lignwood, New Scone, ...	4th April, 1878
Campbell, P. W., Muirton Bank, ...	9th March, 1899
Campbell, W., Glover Street, ...	12th January, 1899
Campbell, W., Grocer, High Street, ...	8th December, 1898
Carmichael, Rev. W. H. G., M.A., Bon-Accord Villa, Glasgow Road, ...	4th April, 1878
Carr, A., 29 James Street, ...	8th December, 1898
Carruthers, Dr., Rose Terrace, ...	12th January, 1893
Chalmers, James, Laurel Bank, Bridgend, ...	7th April, 1892
Chalmers, Thomas, Solicitor, Tay Street, ...	23rd November, 1883
Chambers, G. S., Forgandenny, ...	12th January, 1899
Chapman, Samuel, King James Place, ...	16th January, 1896
Christie, James, 8 Paul Street, ...	11th April, 1895
Chrystal, George, St. John's Foundry, ...	2nd December, 1880

Clacher, James, George Crescent, ... 3rd April, 1879
Clark, Rev. P. A. Gordon, Free West Manse, Kinnoull, 14th December, 1893
Coates, Andrew, Pitcullen House, ... 3rd June, 1869
Coates, Henry, F.R.S.E., Pitcullen House, ... 6th May, 1875
Coates, James, Pitcullen House, ... 6th May, 1875
Coates, Miss, Pitcullen House, ... 3rd January, 1878
Coates, Mrs., Pitcullen House, ... 8th January, 1880
†Colquhoun, Col., Clathick, Crieff, ... 5th December, 1878
Cox, Mrs., Glendoick, Glencarse, ... 14th November, 1895
Cox, W. H., Snaigow, Dunkeld, ... 8th December, 1898
Crawford, Rev. T., B.D., Balnacraig, Barnhill, ... 7th April, 1892
Crawford, Thomas, High Street, ... 10th January, 1898
Cruickshank, J. S., St. John Street, ... 1st February, 1883
†Curr, Henry, Pitkellony House, Muthill, ... 2nd December, 1880

Davidson, Alex., Water Manager, Glasgow Road, ... 2nd March, 1882
Davie, William, Woodbrae, Dunkeld, ... 12th January, 1899
Deas, John B., South Methven Street, ... 1st September, 1870
Deas, J. B., Strathearn Terrace, Glasgow Road, ... 13th December, 1894
Deas, Miss, Rosemount Place, ... 16th January, 1896
Dewar, James, Kincarrathie Crescent, ... 16th January, 1896
Dewar, Mrs. James, Kincarrathie Crescent, ... 9th March, 1899
Dewar, John A., Lord Provost, Balcraig, ... 7th February, 1878
Dewar, John, jun., Balcraig, ... 9th December, 1897
Dewar, Miss, Rose Cottage, Bridgend, ... 12th January, 1899
Dewar, Miss D., Rose Cottage, Bridgend, ... 8th December, 1898
Dickson, Miss, Greenbank, ... 2nd February, 1882
Dickson, Miss M. G., Greenbank, ... 9th April, 1896
Dobbie, J. R., 3a Pitt Street, Edinburgh, ... 13th February, 1890
Dow, Robert, Schoolhouse, Longforgan, ... 4th May, 1892
Dow, T., Muirhall Terrace, ... 8th December, 1898
Drummond, Col. H. S. Home, Blairdrummond, ... 9th March, 1899
Duncan, G. Smith, Law Park, ... 3rd December, 1885
Duthie, Lieut.-Col., Row, by Doune, ... 10th December, 1891

Ellison, Samuel T., Bonavista, Glasgow Road, ... 7th March, 1878
Ellison, William, 2 Balhousie Street, ... 3rd March, 1881
Evans, Miss Z. E., Balhousie Street, ... 10th December, 1895
Evans, W., 38 Morningside Park, Edinburgh, ... 12th January, 1899
Ewing, Robert, Queen Street, Craigie, ... 8th December, 1892

Fairweather, J., Pitheavlis Bank, Glasgow Road, ... 8th December, 1898
Falconer, William D. M., James Street Cottage, Blairgowrie, 9th March, 1899
Farquhar, Rev. Canon, Balhousie Street, ... 8th December, 1887
Farquharson, William, Nurseryman, Bridgend, ... 4th December, 1884
Fehrenbach, G. W., Watchmaker, Dunkeld, ... 7th February, 1884
Fenwick, F., Pitcullen Terrace, ... 8th December, 1898
Ferguson, Dr., Charlotte Street, ... 3rd May, 1883
Ferguson, Rev. J., M.A., B.D., Manse, Aberdalgie, ... 5th January, 1882
Ferguson, R. C., Ferndale, Barnhill, ... 11th April, 1889
Ferrier, D., Edina Villa, Edinburgh Road, ... 10th December, 1891
Folkarde, Arthur, 2 David Street, Blairgowrie, ... 14th December, 1893
Forbes, Miss, 23 North Methven Street, ... 3rd May, 1883

Forbes, Miss Alice, Larchwood, Pitlochry, ... 9th February, 1899
Forbes, Samuel, Croft House, Bridgend, ... 16th January, 1896
Frew, Thomas, King James Place, ... 16th January, 1896

Gall, Miss, 8 Glover Street, ... 14th November, 1895
Galloway, David, Vine Bank, Kinnoull, ... 5th January, 1882
Garvie, William, Hay Street, Balhousie, ... 7th February, 1884
Gloag, Robert, St. Catherine's Place, ... 13th December, 1894
Gold, Miss Hannah, LL.A., Alyth, ... 6th March, 1897
Graham, Dr., Dunalastair, ... 10th December, 1891
Grahame, John, Sheriff-Substitute, Tay Street, ... 5th February, 1885
Grant, John S., Ballinluig, ... 13th December, 1894
Gray, Col. Stuart, Kinfauns Castle, ... 9th February, 1899
Gray, George, Bowerswell, ... 2nd February, 1882
Grieve, George, New Scott Street, ... 6th January, 1876

Halley, Robert, Barossa Place, ... 16th January, 1896
Hay, James, County Place, ... 5th February, 1880
†Hay, Major Drummond, Seggieden, ... 14th January, 1897
Hay, Miss, Gowanbank, ... 3rd January, 1878
Henderson, J., 26 Princes Street, ... 9th December, 1898
Hodge, A., Priory Place, Craigie, ... 11th April, 1889
Holloway, R., Rocklyn Villa, 2 Queen Street, ... 8th December, 1898
Humble, Miss Eleanor W., 32 Balhousie Street, ... 10th December, 1896
Hunt, Dr. Leigh, King Street, ... 2nd February, 1882
Hunter, Patrick, Waterybutts, Errol, ... 22nd February, 1894
Hutcheson, Andrew, Beechwood, ... 11th April, 1895

Jameson, A., Sheriff of Perthshire, 14 Moray Place, Edinburgh, ... 7th April, 1892
Jameson, Harry, Claremount, Kinnoull, ... 14th November, 1895
Jameson, Melville, jun., Fernhill, Kinnoull, ... 7th January, 1869
Jamieson, Alex., Barossa Place, ... 5th January, 1882
Jamieson, Miss, Barossa Place, ... 3rd January, 1878

Kennedy, James, Teacher, Ballinluig, ... 1st May, 1884
Kethell, R., 3 New Scott Street, ... 8th December, 1898
Kidston, R., F.R.S.E., F.G.S., 12 Clarendon Terrace, Stirling, ... 4th December, 1884
King, Alex., Pitcullen Terrace, ... 13th February, 1890
Kinloch, R., W.S., Clydesdale Bank, ... 18th December, 1890
Kinloch, Sir John, Bart., M.P., Kinloch, Meigle, ... 7th April, 1892
Kinnaird, James, Birnam, ... 12th January, 1899
Kippen, R. M., Solicitor, Tay Street, ... 2nd March, 1882
Kirk, Charles, 156 Sauchiehall Street, Glasgow, ... 11th April, 1895

Laing, W. H., Bridge of Earn, ... 13th April, 1899
Landreth, Rev. P. R., Pedwarden Road, ... 12th January, 1899
Law, Charles, Princes Street, ... 7th February, 1884
Leslie, J., Pitcullen, ... 7th April, 1892
Lorimer, G., Tay Street, ... 10th January, 1895
Love, Thomas, St. John's Place, ... 4th May, 1882

Lowe, William, Bon-Accord Villa, Balhousie Street, ...	14th April, 1898
Lowson, D. S., M. A., The Pines, Balhousie, ...	1st April, 1886
Lumsden, A. H., George Street, ...	3rd May, 1883
Malcolm, J. Buttar, Auchterarder Castle, ...	13th April, 1899
Malloch, Gilbert, Arn Villa, Glasgow Road, ...	16th January, 1896
Malloch, P. D., Arn Villa, Glasgow Road, ...	2nd December, 1870
†Mansfield, The Right Hon. the Earl of, Scone Palace,	9th March, 1896
Marshall, D., Tay Street, ...	7th January, 1866
Marshall, Thomas, The Store, Stanley, ...	1st October, 1868
Martin, Andrew, Mount Tabor, Kinnoull, ...	4th December, 1884
Martin, Miss, Mount Tabor, Kinnoull, ...	13th February, 1896
Martin, George, Bonavista, Glasgow Road, ...	16th January, 1896
Martin, Mrs., Bonavista, Glasgow Road, ...	16th January, 1896
Masterson, J., 28 Mill Street, ...	10th December, 1894
Meldrum, R. H., Schoolhouse, Tibbermore, ...	1st May, 1884
Menzies, Alex., Webster's Seminary, Kirriemuir, ...	7th December, 1882
Menzies, James, 71 Strathmore Street, ...	12th March, 1896
Menzies, Sir Robert, Bart., Castle Menzies, Glen Lyon,	1st February, 1883
Mercer, Miss, Kingarth, Crieff, ...	3rd March, 1884
Mercer, Miss Louisa, Kingarth, Crieff, ...	3rd March, 1884
Mercer, W., Photo Art Co., George Street, ...	8th January, 1899
Millais, Geoffrey, Bowerswell, ...	14th April, 1898
Miller, Alex., 1 Croft Bank, Craigie, ...	14th November, 1895
Miller, F. Norie, Feu House, ...	8th December, 1892
Miller, Mrs. F. Norie, Feu House, ...	10th January, 1895
Miller, George, Muirhall Terrace, Bridgend, ...	7th April, 1892
Miller, George A., W. S., Knowehead, ...	2nd December, 1886
Miller, J. G., Solicitor, Blackfriars Street, ...	23rd March, 1893
Miller, P., 2 Evelyn Terrace, Craigie, ...	8th December, 1898
Miller, William, 9 Rose Terrace, ...	7th February, 1884
Miln, D. N., County Place, ...	16th January, 1896
Minto, John, M. A., Sandeman Public Library, ...	6th April, 1897
Moffat, Thomas, Teacher, Forgandenny, ...	14th November, 1895
Moncreiffe, Sir R. D., Bart., Moncreiffe House, Bridge of Earn, ...	17th May, 1874
Moncrieff, R. H., W. S., Potterhill, ...	10th December, 1891
†Moncrieff, Sir A., F. R. S., Bandirran, ...	9th February, 1893
Moncrieff, John, Elmside, ...	2nd April, 1885
Moncrieff, Thomas, St. Leonard Street, ...	2nd February, 1882
Moncrieff, Thomas, Balhousie, ...	5th March, 1885
Moncur, J., Caledonian Railway Engineer's Office, ...	13th April, 1899
Morison, J. Brown, F. R. S. E., Murie, Errol, ...	4th April, 1878
Morison, James, Hasland, Kinnoull, ...	7th February, 1884
Morison, Miss, Hasland, Kinnoull, ...	13th February, 1890
Morison, W., Gowrie Street, Bridgend, ...	16th January, 1896
Morrison, David, St. Catherine's Place, ...	5th December, 1878
Muirhead, George, 5 North Port, ...	14th November, 1895
Munro, John, Charlotte Street, ...	12th March, 1896
Murray, Miss Gladys Graham, Stenton, Dunkeld, ...	8th January, 1899
M'Ainsh, Rev. John, B. D., F. C. Manse, Strathbraan, Dunkeld, ...	12th January, 1899
M'Alpine, W., 83 Glover Street, ...	8th December, 1898
M'Arthur, John, 120 High Street, ...	7th February, 1884

M'Donald, A. Burns, Earnoch, ... 14th March, 1895
M'Donald, James, Atholl Place, ... 9th April, 1892
M'Donald, Miss, Atholl Place, ... 8th December, 1892
M'Donald, Miss Barbara, Castleview, Glasgow Road, ... 11th February, 1897
M'Dougall, Rev. G. P., F.C. Manse, Bankfoot, ... 12th April, 1894
M'Duff, A., Bonhard, ... 3rd December, 1885
M'Duff, Mrs., Bonhard, ... 23rd November, 1883
M'Ewen, James, 20 Marshall Place, ... 7th April, 1892
M'Gregor, Atholl, Eastwood, Dunkeld, ... 7th December, 1882
M'Gregor. David, 40 George Street, ... 2nd March, 1882
M'Gregor, John, Knowe Villas, Craigie, ... 2nd March, 1871
M'Gregor, John, 30 North Methven Street, ... 4th March, 1886
M'Gregor, Miss Murray, Barossa Place, ... 9th March, 1899
M'Gregor, Peter, National Bank, ... 5th March, 1885
M'Gregor, T. M., Printer, Horse Cross, ... 5th March, 1885
M'Kenzie, Alex., 18 Strathmore Street, ... 14th April, 1898
M'Kenzie, A. F., Photographer, Birnam, ... 9th March, 1899
M'Kenzie, Hon. Lady Marjory, Balboughty, ... 9th December, 1897
M'Kenzie, George A., Solicitor, George Street, ... 12th April, 1870
M'Kie, George, Hospital Street, ... 8th December, 1898
M'Kinnon, John, Pitcullen Crescent, ... 22nd February, 1894
M'Laren, William, Architect, ... 7th February, 1878
M'Leish, James, Mill Street, ... 4th April, 1878
M'Leod, Miss, 3 Fairmount Villas, ... 10th February, 1898
M'Nab, Miss, L.L.A., Fitzroy Terrace, ... 14th November, 1895
M'Naughton, Dr. John, General Prison, ... 4th April, 1880
M'Naughton, Miss Eliza, Barossa Place, ... 9th March, 1888
M'Naughton, Miss E. G., Barossa Place, ... 9th March, 1888
M'Neill, John, Balhousie, ... 2nd March, 1871
M'Quibban, William, 67 Main Street, Bridgend, ... 14th December, 1893

Nicol, Edward, Atholl Street, ... 10th December, 1891
Nicol, A., Atholl Street, ... 12th November, 1895

Ogilvie, James, Brewer, Blairgowrie, ... 7th February, 1884
Oliver, Charles, Dunphail, Craigie Road, ... 12th January, 1899
Oswald, Rev. Robert, B.D., 2 Strathearn Terrace, ... 13th April, 1899

Pagan, Miss M. A., Rockclyffe, Crieff, ... 14th April, 1898
Parker, Charles S., Fairlie, Largs, ... 7th December, 1871
Paterson, W. A., Croft House, Craigie, ... 2nd March, 1882
Paton, Dr., Atholl Place, ... 14th November, 1895
Peddie, D., Ironmonger, Market Street, ... 1st May, 1873
Peddie, R., Victoria Street, ... 8th December, 1898
Phillips, Miss, Tay Street, ... 18th January, 1884
Pinkerton, J. C., Kincarrathie Crescent, ... 5th December, 1872
Pinkerton, Miss Anne, Kincarrathie Crescent, ... 9th December, 1897
Pitcaithly, Alex., Jeaniefield, Old Scone, ... 10th February, 1898
Proudfoot, James, Melville Street, ... 5th March, 1885
Pullar, A. E., The Durn, ... 23rd November, 1883
Pullar, Mrs. A. E., The Durn, ... 7th April, 1882
Pullar, Herbert, Rosebank, ... 5th May, 1887
Pullar, James F., Rosebank, ... 5th December, 1872

Pullar, Mrs. J. F., Rosebank, ... 5th May, 1887
Pullar, Rufus D., Brahan, ... 6th May, 1875
Pullar, Mrs. R. D., Brahan, ... 14th April, 1881
Pullar, Sir Robert, Tayside, ... 2nd March, 1871
Pullar, Lady, Tayside, ... 14th April, 1881

Ramsay, James, Balhousie Castle, ... 13th December, 1894
Rands, H., Rocklyn Villa, Craigie, ... 9th February, 1899
Readdie, David, St. Leonard's Bank, ... 8th December, 1898
Reid, Arthur S., M.A., F.G.S., etc., Trinity College, Glenalmond, ... 10th December, 1891
Reid, James, Allan House, Blairgowrie, ... 14th December, 1893
Reid, Walter, Auchterarder House, Auchterarder, ... 12th March, 1896
Riach, Miss, 3 Mansfield Place, ... 3rd January, 1878
Riach, T. G., 3 Mansfield Place, ... 12th April, 1894
Ritchie, J., LL.B., Solicitor, Tay Street, ... 12th January, 1893
Ritchie, Mrs. Rosemount Place, ... 10th January, 1895
Ritchie, Miss, Moncreiffe Terrace, Craigie, ... 14th November, 1895
Robertson, Charles, 94 High Street, ... 14th April, 1878
Robertson, William, 2 Blackfriars Street, ... 2nd March, 1882
Robertson, Dr., 23 Marshall Place, ... 14th November, 1895
Robertson, Dr. Robert, Errol, ... 2nd May, 1867
Robertson, Dr. William, Scone, ... 9th March, 1899
Robertson, James, Mansfield Place, ... 14th December, 1893
Robertson, John, 6 Croft Bank, Craigie, ... 12th January, 1899
Robertson, John A., Solicitor, Tay Street, ... 7th February, 1884
Robertson, Miss, Springbank, ... 3rd January, 1878
Robertson, Robert, Blairgowrie, ... 4th January, 1877
Robertson, Robert Hay, 22 High Street, ... 2nd March, 1882
Robertson, William, 24 Canal Street, ... 8th December, 1898
Robson, Rev. George, D.D., Garry Lodge, ... 13th January, 1898
Rodger, Alex. M., Tay Street, ... 14th February, 1895
Rodger, James, B.A., Myrtle Cottage, Rattray, ... 14th April, 1899
Rorison, Very Rev. Dean, D.D., Barossa Place, ... 18th December, 1890
Roy, Mrs., Craigclowan, ... 3rd May, 1883
Roy, Mrs., Springbank, ... 3rd January, 1878
Russell, J., Craigie Place, ... 8th December, 1898
Rutherford, W., Pitcullen Terrace, ... 5th March, 1885

Sadler, W. W., 42 Tay Street, ... 9th March, 1899
Sandeman, Miss Stewart, Stanley, ... 11th April, 1899
Scott, Alex., 10 George Crescent, Glasgow Road, ... 12th January, 1899
Sellar, J., The Den, ... 1st March, 1883
Shaw, R., 24 King Street, ... 8th December, 1898
Shields, H., Manufacturer, Dunkeld Road, ... 12th January, 1899
Sime, E., Luncarty, ... 8th December, 1898
Sime, John, Garfield, Glasgow Road, ... 12th April, 1893
Sime, Mrs., Garfield, Glasgow Road, ... 12th January, 1899
Simpson, William, The Lodge, Balhousie Works, ... 14th November, 1895
Smart, David, Kinnoull, ... 2nd May, 1878
Smart, Miss, Kinnoull, ... 10th January, 1895
Smart, Edward, The Academy, ... 14th November, 1895
Smith, Ewen, 19 Queen Street, ... 8th December, 1898

Smith, Rev. Harry, M.A., Tibbermore Manse, ...	13th February, 1896
Smith, Robert, B.Sc., University College, Dundee, ...	11th April, 1895
Smythe, Col. D. M., Methven Castle, ...	13th April, 1882
†Somerville, Rev. J., B.D.—summer address, Castellar, Crieff; winter address, Villa Isaune, Mentone, ...	10th December, 1896
Soutar, J. T., Commercial Bank, ...	9th March, 1896
Steele, Adam, Blackpark, ...	14th February, 1895
Steele, Sidney, Fairmount, ...	12th April, 1894
Stewart, James, 19 Princes Street, ...	5th January, 1882
*Stewart, John, 19 Princes Street, ...	28th February, 1867
Stewart, John, Northern School, Falkirk, ...	9th May, 1889
Stewart, Robert, St. John Street, ...	12th January, 1899
Stewart, J., Ferguson's Manure Works, ...	8th December, 1898
Stirling, Col., Gargunnock, Stirling, ...	10th January, 1889
Stirling, David, M.D., Riversdale, ...	4th April, 1880
Stirling, Dr. Robert, Atholl Place, ...	13th February, 1890
Syme, A. B., Muirton Bank, ...	7th February, 1884
Tait, Mrs., Manse, St. Madoes, ...	3rd December, 1885
Tait, Rev. Walter, Manse, St. Madoes, ...	3rd May, 1877
Taylor, David, 40 Balhousie Street, ...	9th February, 1893
Thomas, John, Barossa Place, ...	3rd November, 1870
Thomas, Miss C., Barossa Place, ...	14th November, 1895
Thomas, Miss M., Barossa Place, ...	2nd December, 1886
Thomson, Dr. Andrew, M.A., F.R.S.E., etc., Ardenlea, Pitcullen, ...	13th November, 1890
Thomson, James, Kinnoull, ...	23rd November, 1883
Thomson, J. L., Sculptor, 64 Princes Street, ...	14th April, 1898
Trotter, Dr., Tay Street, ...	4th May, 1882
Trotter, R. S., Tay Street, ...	3rd March, 1884
Tuke, Alfred, Station Hotel, ...	16th January, 1896
Turnbull, Mrs., Atholl Crescent, ...	3rd January, 1878
Urquhart, David, North Methven Street, ...	12th January, 1899
Urquhart, Dr., Murray House, ...	14th May, 1882
Valentine, George, The Knowe, Craigie, ...	8th May, 1890
Wallace, Miss, Knowehead, ...	7th April, 1892
Wallace, Robert, Q.C., M.P., 3 King's Bench Walk, N., The Temple, ...	14th November, 1895
Watson, Miss, Inchyra, ...	13th December, 1894
Watson, W., Plumber, Mill Street, ...	10th January, 1895
Watt, Mrs., Rosenheim, Glasgow Road, ...	12th January, 1899
Watters, John, 59 North Methven Street, ...	2nd February, 1882
Westwood, Alex., Princes Street, ...	5th January, 1882
White, Frank H. Buchanan, Annat Lodge, ...	4th February, 1886
White, T. Clement C. Buchanan, Annat Lodge, ...	14th November, 1895
White, Miss Gladys, Annat Lodge, ...	13th February, 1896
White, J. Martin, Balruddery, near Dundee, ..	2nd March, 1882
Wilkie, R., King Street, ...	8th December, 1898
Wilson, D. J., Bank of Scotland, St. John Street, ...	13th December, 1894
Wilson, Mrs. D. J., Bank of Scotland, St. John Street,	9th March, 1899

Wilson, John, Arngask Schoolhouse, Glenfarg, ...	1st April, 1886
Winter, James, Comely Bank, ...	12th January, 1893
Winter, John, 35 George Street, ...	2nd July, 1868
Winton, William, 20 Pomarium, ...	11th February, 1898
Wood, C. L., Freeland House, Forgandenny, ..	15th May, 1880
Wood, John, jun., Dupplin Bank, Kinnoull, ...	11th April, 1889
Wright, Alex., South Street, ...	13th December, 1894
Wright, Robert, Balhousie Street, ...	4th March, 1886
Young, George, Tay Street, ...	2nd May, 1872
Young, George, 8 Kinnaird Bank, Craigie, ...	14th November, 1895
Young, James M., Printer, Watergate, ...	8th November, 1894
Young, W. Cochrane, Solicitor, St. John Street, ...	7th December, 1882

ASSOCIATE MEMBERS.

Alexander, George, 43 Cross Street, ...	14th April, 1898
Burnett, Thomas, 2 Victoria Street, ...	12th March, 1896
Crichton, Daniel, 19 Market Street, ...	12th March, 1896
Cumming, A. G., Stationer, 153 High Street, ...	12th March, 1896
Dobbie, William, Readdie's Buildings, Dunkeld Road,	14th April, 1898
Duncan, Andrew, 15 Bridge Lane, ...	12th March, 1896
Keir, John N., 1 Keir Villa, Bridgend, ...	14th January, 1897
Lawson, Robert, 6 High Street, ...	11th April, 1895
Lindsay, James, Gardener, Balcraig, ...	12th March, 1896
M'Donald, Colin, 28 St. John Street, ...	5th November, 1896
M'Gregor, Donald, Battleby, Redgorton, ...	12th March, 1896
Neff, Jacob, Muirton Place, Dunkeld Road, ...	14th April, 1898
Nelson, David, 17 Kinnoull Street, ...	12th March, 1896
Rattray, J. P., Whitefriars Street, Dovecotland, ...	14th April, 1898
Todd, Thomas, Glover Street, ...	14th April, 1898
White, William, 29 Kirkgate, ...	14th November, 1895
Wylie, William, 17 Commercial Street, Bridgend, ...	12th March, 1896
Young, Thomas, Murray Street, ...	14th April, 1898

SUMMER EXCURSIONS, 1899.

The following Excursions were arranged :—

1. Monday, 22nd May (Queen's Birthday).—Dura Den. Leader, Mr. J. B. Corr.

2. Saturday, 10th June.—Kinnaird Castle. Leader, Colonel Campbell.

3. Saturday, 24th June (Half-Day).—Glenfarg to Bridge of Earn. Leader, Mr. Barclay.

4. Saturday, 1st July (Half-Day).—Stanley, by Stormontfield, to Strathord. Leader, Mr. James Menzies.

5. Saturday, 22nd July (Half-Day).—Loch Leven. Leader, Mr. James Morison.

6. Saturday, 29th July.—Ben Ledi. (Joint Excursion with the Natural History Society of Edinburgh.)

7. Saturday, 12th August (Half-Day).—Birnam Falls. Leader, Mr. C. M'Intosh.

BALANCE-SHEET of THE PERTHSHIRE SOCIETY OF NATURAL SCIENCE for the Year ended 28th February, 1899.

INCOME.

To Balance in Savings Bank at 28th February, 1898, ...	£1 12 11		
,, Balance in Treasurer's hands, ...	11 8 0		
		£13	0 11
,, Annual Subscriptions and Entrance Fees, ...		91	13 0
,, Donation to meet expense of fitting-up Dark Room, ...		13	5 0
,, Contributions towards expenses of Coal and Gas, ...		3	0 0
,, Old Furnishings, etc., sold, ...		4	10 0
,, *Transactions* sold (back numbers), ...		1	1 0
		£126	9 11

EXPENDITURE.

By Proportion of Janitor's Salary, ...		£5	0 0
,, Fire Insurance, ...		7	0 0
,, Feu-duty, ...		7	7 4
,, Repairs and Furnishing, ...		5	19 6
,, Fuel, etc., ...		15	12 2
,, Printing Society's *Transactions*, ...		31	4 6
,, Books, Magazines, and Binding, ...		23	6 6
,, Postages, Stationery, and Petty Expenses, ...		6	8 5
,, Subscriptions to other Societies, ...		1	1 2
,, Expense of fitting-up Dark Room, ...		13	5 0
,, Balance in Savings Bank, ...	£1 12 11		
,, Balance in Treasurer's hands, ...	8 12 5		
		10	5 4
		£126	9 11

PERTH, 9th March, 1899.—We have examined the foregoing Accounts for the Year, with the relative Vouchers, and found them correct. The sum in Savings Bank at the close of the year is £1 12s 11d, and in the Treasurer's hands £8 12s 5d.

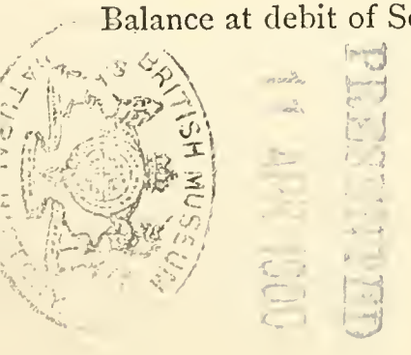
(Signed) JAMES MORISON, WM. BARCLAY, } *Auditors.*

PERTHSHIRE SOCIETY OF NATURAL SCIENCE—MUSEUM FUND.

Abstract of Accounts, Year ending March, 1899.

RECEIPTS.

Subscriptions and Grants, ...	£306	2 0
Collected per Box in Museum, ...	3	17 1
Year's Receipts, ...	£309	19 1
Balance at debit of Society, March, 1899, ...	41	9 2
	£351	8 3



PAYMENTS.

Balance at debit of Society, March, 1898, ...		£176	8 1
Less—Donation from Sir Robert Pullar, ...		100	0 0
		£76	8 1
Salaries of Curator and Janitor, ...	£170 0 0		
Specimens and Models, ...	48 3 0		
Boxes, Tablets, etc., ...	34 11 8		
Furnishings and Repairs, ...	11 12 8		
Repairs to Cases, ...	4 6 4		
Petty Outlays, ...	6 6 6		
		275	0 2
		£351	8 3

[Published 1st November, 1899.]

WINTER SESSION, 1899-1900.

9th November, 1899.

HENRY COATES, F.R.S.E., President, in the Chair.

Mr. Alex. M. Rodger, as Delegate of the Society to the British Association for the Advancement of Science, gave a report of the Meetings of the Association at Dover.

He also, as Delegate to the Museums' Association, gave a report of the Meetings of that Association at Brighton.

The President delivered the following Opening Address :—

LADIES AND GENTLEMEN,—At the beginning of the winter session it has been our custom to review, very briefly, the work of the Society during the preceding summer, and to record any outstanding features of the season that may have affected animal and plant life in our district, or any features of inorganic nature that may have been brought to light.

GEOLOGICAL NOTES.

To take the last of these heads first, I may refer to the strata of superficial deposits which have been revealed in the deep cutting recently made across the North Inch and along Tay Street for the purpose of laying a new culvert. These are of interest as throwing some light on the conditions which have obtained in this part of the Tay Valley since early post-glacial times. Across the North Inch, where the cutting was about twelve feet deep, the deposit consists almost entirely of finely bedded sand and silt, evidently of river origin, and laid down without much disturbance. Intercalated with these are occasional beds of fine river-worn gravel. In Tay Street, where the cutting was rather deeper, a larger proportion of argillaceous material was revealed, the clay being mingled with the sand and silt. The conclusions which these conditions indicated were that for a very long period the ground now occupied by the North Inch has been a growing "Haughland," gradually being built up by layers of fine sediment spread upon its surface by the river when in flood, and that, in the lower reach, estuarine conditions were beginning to make themselves felt.

This reference to the deposition of sediment by the river suggests a subject of enquiry which was referred to by Sir Archibald Geikie in his recent address to the Geological Section of the British Association. His chief topic was the age of the earth, and he pointed out how impossible it was to estimate the time necessary for the building up of any particular series of sedimentary rocks without careful and prolonged experimental investigation, carried on simultaneously by a number of observers in different parts of the country, for the purpose of recording the rate at which a given area was being denuded, or at which a given deposit was being built up.

Now, no district could be more suitable for such a series of observations than our own county, embracing, as it does, nearly the whole drainage area of one great river system. Such observations should include the amount of sediment, in suspension, being carried down by the river at stated points and at stated intervals; also the rate at which deposition is taking place on the lower haughlands, the accumulation of material in the lochs of the county, and the growth of sand and mud banks in the estuary. I am well aware of the practical difficulties which stand in the way of such a series of systematic investigations, but if they could be carried out there can be no doubt as to their value for the advancement of scientific truth, and I throw out the suggestion in the hope that at some time in the future it may be taken up.

SEASONAL NOTES.

The meteorological conditions of the past season have been, in many respects, as remarkable as those which were experienced during the summer of 1898, and the results have been equally striking. In early spring the conditions were exceptionally unfavourable to vegetation, owing to the long-continued cold and dry winds. As a result, plant growth was at least a month behind the average by the middle of May. In early June, however, a complete change took place, and, except during a week or two in July, the weather during the whole summer and autumn has been the most favourable that has been experienced for many years. At times the heat has been excessive, as on June 12th, when the thermometer registered a maximum of 80 degrees in the shade and 116 degrees in the sun at Pitcullen. On the following night the minimum fell as low as 38 degrees, showing how clear was the atmosphere and how great the radiation. In August, also, continuous high temperatures were registered, with almost no rainfall, the total for the three weeks ending August 26th being only ·26 inch, while the maximum temperatures ranged from 74 to 79 degrees.

The result of these exceptional seasonal conditions has been a most abnormal growth of vegetation. This has been seen more especially in regard to the deciduous trees and herbaceous plants. During August the growth of young shoots on these could almost be marked from day to day. Leafage has been exceptionally heavy and enduring, and autumn fruits have been more abundant and of stronger growth than for many years past. In no case has this been so marked as with the oaks, the crop of acorns being quite phenomenal. This luxuriant growth of leaf and fruit is probably due to the long-continued check which vegetation received in the early part of the season, followed by the equally long-continued genial conditions of summer, which enabled the plants to reserve their resources until the time came for their full development. Exactly an opposite effect has been produced on those forms of vegetation, such as fungi, which require an abundance of moisture for their full development. In illustration of this, I append a note which has been kindly furnished to me by Mr. Charles M'Intosh of Inver.

The season has been favourable also for many forms of animal life, because, unlike the summer of 1898, the atmosphere has generally been clear and bracing, and free from the dampness and closeness which are frequently experienced in excessively hot summers. The conditions have been particularly favourable to bird life. Those birds particularly, such as the blackbird and thrush, which live largely on berries and other fruits, have been very abundant. The same remark applies to many of the smaller mammals, such as the squirrel.

THE SOCIETY.

Turning now to what we may call the domestic affairs of our Society, some pleasing features of the work of the past session fall to be recorded.

On the invitation of the Committee of the Sandeman Public Library, your Council agreed to join with them in issuing a small quarterly journal, to be called the "Perth Library and Museum Record." The primary object of the publication is to bring under the notice of the public recent additions to the Library and Museum, but it is also intended to have short articles and notes on subjects of interest connected with Library and Museum work. To us it is particularly gratifying to have the two institutions brought into such close touch with each other, as their aims are to such a large extent identical, namely, the intellectual advancement of the community.

Our own Library has received one valuable addition during the past summer, namely, 170 volumes, the property of the late Mr. Andrew Moffat, formerly Secretary of the Edinburgh Field Club, and presented to our Society by his son, Mr. G. L. Moffat, M.A. These embrace the works of several of the leading botanists and zoologists of the earlier part of this century, and my object in referring to them now is to point out the importance of studying any particular science from an historical point of view, and of tracing its gradual evolution as a department of human knowledge. Our Library, while embracing many of the most important recent works of reference in natural science, was rather deficient in the earlier scientific classics, but the books just presented to us will, to a considerable extent, remedy this deficiency, and enable the student, not only to study nature by the light of present-day knowledge, but to follow the researches of a past generation of workers.

Another feature of the past session has been the monthly meetings of the Photographic Section, for the exhibition and comparison of members' work in certain specified subjects, such as studies of trees, flowers, children, old buildings, etc. I think those who have taken part in these meetings will agree with me that they have been extremely useful in stimulating to more careful work, and in giving a definite aim to photographic study. The only disappointing feature has been the smallness of the attendances, though many members have doubtless a natural reluctance to attending indoor meetings on fine summer evenings.

Turning now to the winter session which has just commenced, I would venture to express the hope that the general body of the

Photographic Members will support the efforts of the Photographic Committee a little more heartily than they have done in the past, both in the way of attending the meetings and of adding to the interest of these meetings by contributing short papers or notes or by exhibiting examples of their work. It should always be remembered that even indifferent work is as instructive, for purposes of comparison, as work of a higher standard.

I should at the same time like to draw the attention of all interested in geology to the course of six lectures on Historical Geology and Palæontology, to be delivered in February next, by Mr. James B. Corr of Dundee. This will be a rather more systematic course than the one which he delivered to us last spring, which was mainly introductory. Geology is such a very wide subject that even the student who has already made considerable progress in it must benefit by having his memory refreshed by such a course as this, and I trust, therefore, that the attendance will be at least as large as last time. As certain expenses are incurred in connection with these lectures, a charge of five shillings is made for the course.

The last item of the Society's work to which I wish to refer is the Children's Essay Competition, and this I do merely to remind the young people that their essays should be sent to the Secretary or the Curator before the close of the year. The subject for this session, namely, "The Divisions of the Animal Kingdom as illustrated in the Index Museum," has been chosen with a view to induce the children to take a more systematic interest in the world of animal life around them. The subject for last year was purposely an introductory one, in order to ascertain how far the children could grasp the general scope and aim of the Museum as an introduction to the study of natural history. I need hardly repeat that the greater the number of children taking part in the competition the better I shall be pleased.

In regard to the Museum itself, the department which has engaged most of the attention both of the Curator and myself during the past summer is

THE ROCK COLLECTION IN THE INDEX MUSEUM.

The science of Geology, as I have already indicated, is a very wide one. It embraces the history of the evolution of the earth's crust, and therefore deals with the materials of which that crust is composed from many points of view. One department, for example, has to do with the historical sequence in which these materials have been built up, another takes note of the vestiges of life which are scattered through them, and so on. The department which the collection under consideration is intended to illustrate takes cognisance of rocks as definite and differentiated structures, without reference to their position in the geological record, or the lessons which they teach regarding the action of the various forces which have moulded the earth's crust. This department of Geology is known as Petrology, or the study of rocks as such, pure and simple. It may be said to correspond to anatomy in the domain of organic

science, where the structure and comparison of the different organs of the animal or plant are considered apart from their functions or their growth.

Our Type Rock Collection, then, is intended as an introduction to the study of Petrology, and amongst the lessons which it is intended to teach are—(1) What are the principal kinds of rock which go to build up the solid crust of our globe; (2) how are these different kinds related to each other, and how may they be classified in a logical sequence; and (3) how do they differ from each other in mineral constitution and in macroscopic and microscopic structure. These subjects of enquiry we have endeavoured to illustrate by means of carefully-selected specimens, full explanatory labels, and photographs and coloured drawings. In studying the collection, the first fact to be grasped is that all rocks are divided broadly into three main groups, resultant on their mode of origin, although, strictly speaking, Petrology does not concern itself with the *modus operandi* of their origin. These groups are—1st, rocks of accumulation, or sedimentary rocks; 2nd, altered, or schistose rocks; and 3rd, rocks which have once been in a molten condition, or igneous rocks. The first of these groups is sub-divided under five headings, according to the nature of the accumulated material, whether it be of (1) sand, (2) clay, (3) volcanic debris, (4) material derived from animal or plant remains, or (5) from the precipitation of various chemicals by the evaporation of the water in which they were dissolved. The third great group, namely the igneous rocks, is sub-divided—somewhat arbitrarily perhaps—into four sections, according to the preponderance of one particular mineral substance, namely, silica, or silicic acid. These sections are called respectively the acid, intermediate, basic, and ultra-basic series. In the first we have, of course, the greatest proportion of silica, and in the last the smallest.

The second great group, namely, that of the schistose rocks, occupies a somewhat anomalous position in the petrological series, as the rocks which it embraces have all originally been normal sedimentary or normal igneous rocks, while in many cases it is difficult to say whether they were originally the one or the other. For this reason I have placed the group in an intermediate position between the two in the collection, although in most text-books, and, therefore, in most museums, its place is at the end of the classification.

Now, assuming that a visitor to the museum, of ordinary intelligence, but entirely ignorant of the principles of geology, should go to this collection for the purpose of learning something about the different kinds of rock, let us see what it is capable of teaching him. It may be taken for granted that to the casual observer, either in town or country, one rock is very much like another, particularly as what he sees—whether it be in the wall of a house or the side of a hill—is generally a more or less weathered surface. In other words, the phrase "a stone" covers a vast variety of structure, composition, and complexity, which to the popular mind differentiates itself into little more than "Freestone" or "Whinstone." Such a visitor, however, going to Table Cases C and D in the Index Museum,

will see about 130 pieces of rock, roughly trimmed with the hammer to a uniform size, so as to expose a fresh and unweathered surface, and all obviously different from each other. If he goes at random even to types which are comparatively familiar to him, the probability is that he will learn something about them that he did not know before. To take a few familiar examples,—if he goes to the specimen of sandstone, he will see, first, that it is placed in the group of rocks which are built up from the ruins of older rocks, that the particles of which it is composed were once borne along by running water and then deposited as sand on the shore of an ancient sea, and, lastly, that the particles of sand have been cemented together by a flinty deposit, stained a red or yellow colour by the presence of iron. Next, if he goes to the group of rocks which are so familiar in the highland parts of our county, both as native rock and as building stone, namely, the various kinds of schist, he will find that these, too, have once been laid down by running water, as the sediment which it could no longer carry, but that, long ages after it had hardened into a sandstone, its particles of quartz and mica got squeezed and contorted in such a way that they were forced to re-arrange themselves in the beautiful wavy lines which are largely accountable for the grandeur of our Highland scenery. Going round the corner to the north side of the case he comes to the granites, and here he will note that he has reached the group of rocks which have come under the influence of the internal heat of the globe, so that they were once reduced to a molten condition, and from that condition they have assumed their present form and structure by a process of crystallisation. In the hand specimen before him the crystals of the three predominating minerals—quartz, mica, and felspar—can be distinctly traced, but the crystalline forms are still more evident in the photograph of a microscopic section which is placed beside the specimen. From this photograph it will be seen that every particle of material has been crystallised. Going farther down the series of igneous, or fire-formed, rocks he will come to basalt, the typical "Whinstone" of the builder. Here the individual crystals are nearly microscopic, and therefore hardly observable in the hand specimen, but a coloured drawing from a microscopic section reveals their presence. This drawing also shows that part of the original glassy structure of the molten rock still remains.

These are but four of the more familiar types, which I have chosen for the purpose of showing how properly-selected specimens, accompanied by fully-descriptive class and individual labels, and by structural drawings, may be made to teach the elements of any branch of natural science. If, on the other hand, the specimens are not selected with special reference to the lesson which they are intended to teach, and if they are not arranged in logical sequence, and labelled according to a uniform and complete system, the result in the mind of the student is only confusion worse confounded. I use the word "student" here, not in the narrow sense of the votary of any particular branch of science, but in the broader sense that every visitor to a museum or a library is, consciously or unconsciously, a

student, who will carry away a lesson if it is put before him in sufficiently plain and intelligible terms.

THE SUMMER EXCURSIONS OF 1899.

The excursions, as a whole, have hardly been so well attended as in former years. They were, however, thoroughly enjoyed by those who were able to be present, as the weather was, as a rule, all that could be desired. The following notes have been supplied to me, chiefly by the several leaders, as I was unfortunately unable to take part in the excursions until nearly the end of the season.

1. May 22, to Dura Den. This excursion, which was held on the Queen's Birthday, was mainly geological, and amongst those present were a number of the members who had attended Mr. Corr's Lectures on Geology. Mr. Corr, who was leader for the day, sends me the following notes:—"The object of this excursion was to give the geological class an opportunity of observing fossils *in situ*, and of inspecting the classic Old Red Sandstone of Dura Den. Starting from Cupar, the party at once set out for Ladeddie, and an old limestone quarry about a mile beyond Pitscottie. Here excavations have been made in one of the numerous beds of Carboniferous limestone which are interbedded amongst the shales and sandstones of the Lower Carboniferous series in Fife. On reaching the quarry, all the available hammers were put into operation without delay, and in a short time quite a number of specimens were obtained. These consisted chiefly of Cup-corals (*Cyathophyllum*), Crinoidal stems, and several species of Brachiopods (*Spirifera* and *Productus*), *Productus spinulosus* being very abundant. By far the rarest fossil in the Ladeddie limestone is the little Carboniferous Trilobite, *Phillipsia mucronata*. Our time being very limited, we only succeeded in excavating one specimen of *Phillipsia*. Returning from Ladeddie to Pitscottie, we then entered Dura Den, passing under the shadow of the great cliffs of Carboniferous sandstone that confront us as we enter the Den from the south. There we pass almost imperceptibly into the Upper Old Red Sandstone, from which were obtained those fine specimens of fishes described and figured by Dr. Anderson in his 'Monograph of the Yellow Sandstone,' and by Professor Huxley in his 'Memoirs of the Geological Survey,' Decade X."

2. June 10, to Kinnaird Castle. Photography was the chief aim of this excursion, and Colonel Campbell, who is always present when there is any work for his camera, sends the following particulars:—"Journeying by rail to Errol, the party were joined by Dr. Robertson, and drove by Fingask to Kinnaird. A thorough examination of the old building was made, and the magnificent view from the battlements was greatly admired. The Castle dates from about the end of the Fifteenth or beginning of the Sixteenth Century. One peculiarity about it is that the lower storey seems to have been only partially vaulted, as the corbels which must have supported wooden beams are still to be seen. The only historical event connected with the building appears to be that James VI. once spent a week or two

there, enjoying his favourite diversion of hunting. After examining the Castle, the photographers set to work to secure pictures of it and of some of the picturesque bits in the neighbourhood. The party then walked along the road to Pitroddie, botanising by the way. A number of interesting plants were got, but nothing of rarity, the only one worthy of special mention being *Geranium lucidum.* There was a good turn-out of members at this excursion."

3. June 24, Glenfarg to Bridge of Earn. This was one of the half-day excursions arranged for those who could not be absent for a whole Saturday. Mr. Barclay, who was the leader, reports as follows :—

"The walk from the station at Glenfarg to Bridge of Earn was very pleasant. The weather was delightful, and the glen, beautiful at all times, was at this season of the year seen at its very best. The flora was pretty thoroughly explored. Though not containing many plants which can be called rare, the vegetation is both rich and varied. The beautiful *Lychnis viscaria*, a rare plant in Scotland, is extremely abundant in Glenfarg, and was in full bloom. Other plants worthy of mention were *Carex paludosa*, *Rosa pimpinellifolia*, and the rare rose hybrid *Rosa involuta.*"

An excursion was arranged for July 15th to the Sma' Glen and Auchnafree, but unfortunately there were not sufficient names sent in to justify the expense of the long drive. It is hoped that it may be possible to arrange this excursion for next season, as the upper part of Glenalmond is certainly worth examining.

4. July 22, to Loch Leven. This being a half-day excursion, the party went by the afternoon train to Loch Leven Station. The loch had been visited a year previously, along with the Scottish Natural History Society, but, as there had been no opportunity on that occasion for visiting the Island and Castle, these were the chief objects of the present visit. The day was rather overcast, and the loch was therefore not looking its best, but the effect of the wooded islands from the water was pleasing. Unfortunately it was not possible to photograph the Castle Island from the boat, and on landing it was found impossible to get a good general view, owing to the thick foliage which surrounded the Castle. One or two near views, however, were obtained. In rowing to and from the Island a number of aquatic plants, chiefly *Potomagetons*, were collected, but none of special rarity. On these some of the commoner Mollusca were found. Mr. Menzies, who had remained on shore, botanised round the end of the loch. The only plants of interest which he found were *Carex disticha* and *Elodea Canadensis.* The last-named was found to be fairly abundant along the margin of the loch.

5. July 29, to Ben Ledi. This excursion was arranged jointly with the Scottish Natural History Society, the members of which we are always pleased to meet in the field. Mr. Barclay sends the following notes :—"There was a large representation of the Edinburgh Society, comprising both ladies and gentlemen, but the

members of the Perthshire Society were few. The combined parties alighted from the train at St. Bride's, and proceeded to scale the heights of the mountain. Heavy clouds of mist were drifting along the side and summit of the hill, and a fierce wind rendered the ascent rather fatiguing. Arrived at the top, occasional bright intervals allowed the party to enjoy the splendid view which the summit affords. The descent was made by Coilantogle, and thence by the Trossachs road to Callander, where the whole party enjoyed tea, the members from Perth as guests of the Edinburgh Society. As regards its flora, Ben Ledi was found to be very disappointing. Some of the commoner alpines were plentiful enough, but the rarer gems of the Breadalbane hills were conspicuous by their absence. *Juncus triglumis* and *Cornus suecica*, the latter in fruit, were the best plants obtained. The geologists, under the leadership of Mr. Goodchild, made a careful study of the schists and arkoses of which Ben Ledi and the adjacent heights are built up, and of the changes to which, in past times, Loch Lubnaig and the Pass of Leny have been subjected."

6. August 12, to Birnam Falls. This was another of the half-day excursions, and was held under perfect weather conditions. The afternoon train gave time for a leisurely walk up the ever-lovely Birnam Glen, but not time for wandering far afield. We were glad to be joined by one or two local members, including Mr. Charles M'Intosh of Inver, who acted as a most efficient leader and local guide. Several members of the Photographic Section were present, and a number of interesting negatives were secured, including views of the Falls. The latter, however, were by no means at their best, owing to the long spell of dry weather. Indeed, they were little more than a series of trickles over the face of the rock. Still, the surroundings were as beautiful as ever, and the foliage and ferns particularly rich. The return was made by a grass path through the wood behind Ladywell Quarry. In this wood a number of interesting fungi were observed, including *Agaricus (Tricholoma) rutilans*, *Boletus elegans*, *B. scaber*, *B. subtomentosus*, *Amanita rubescens*, *Lactarius deliciosus*, and *Phallus impudicus*. The last-named, which is popularly known as the Stinkhorn fungus, is remarkable on account of its powerful and disagreeable odour. A halt was made in the quarry to examine the Tertiary basalt dyke, which cuts through the schistose rocks of the district. Tea at Birnam Institute brought a most enjoyable afternoon ramble to a close.

7. August 19, to Stanley and the Linn of Campsie. This excursion, which was originally fixed for 1st July, had to be postponed on account of wet weather. It was a half-day excursion. Mr. Menzies, who was the leader, reports on it as follows:—"This excursion was a purely botanical one, for the day being dull and threatening deterred our photographic members from coming out. The Linn was first visited, in the vicinity of which a good variety of plant life was found. Amongst this was the birdsfoot, *Ornithopus perspusillus*, a somewhat local plant in dry soils. A patch of the small reed grass *Calamagrostis*

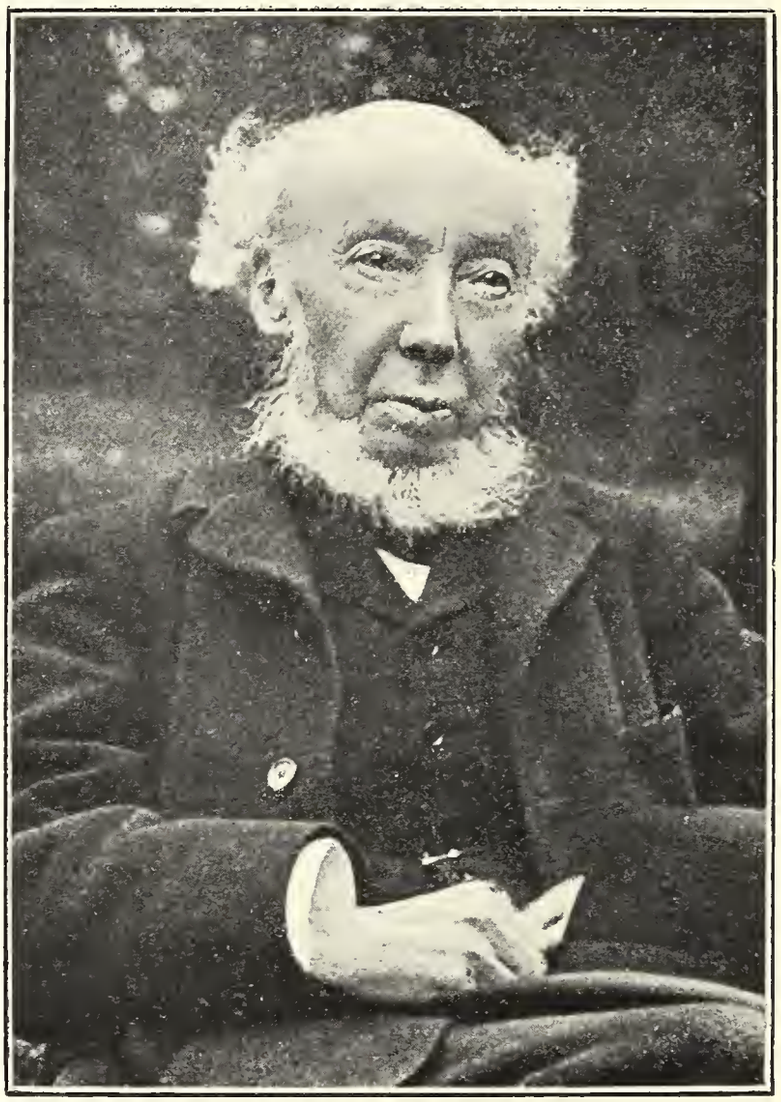
Epigeios was visited. This was a previous discovery here. The plant is rare in Perthshire, and was found in vigorous condition. Near the ferry a plant was found which was at once seen to have no place in the British flora. This was a white-flowered composite, which was ultimately identified as *Senecio suaveolens*, a plant of North American origin, introduced into this country many years ago, but which does not seem to be often found in cultivation. Crossing the river, the party explored the lower left bank, special search being made for *Campanula glomerata*, found here some years ago. No trace of it, however, could be found, but, as the flowering season was past, this could hardly be considered conclusive of the plant's disappearance. A number of our common sedges were found on the margin of the river, with *Molinia cærulea*, the moor grass, and on the borders of a dry pasture *Hypericum humifusum* was found in abundance. Recrossing the river, an unsuccessful search was made down the right bank for *Erythrea Centaurium*, found here once by a member of our Society. The neighbouring wood was explored for some distance, but, with the exception of *Circæa lutetiana*, nothing of any importance was found, the vegetation being of a coarse, rampant character."

In addition to the official excursions just described, two special excursions were held in the spring in connection with Mr. Corr's Geological Lectures. These were to Dunkeld, on 3rd April, and to Moncreiffe Hill, on 11th March. At the former most of the time was spent in the slate quarries of Newtyle Hill, where the structure of the slates was noted and several interesting minerals were observed, including some beautiful iridescent examples of copper pyrites. Ladywell Quarry was afterwards visited, for the purpose of examining the Tertiary basalt dyke which pierces the metamorphic rocks.

In the excursion to Moncreiffe Hill the occurrence of the interbedded Andesites, of Old Red Sandstone age, which constitute the ridge of the Sidlaws, was explained, and specimens of the rock examined.

Appendix—Seasonal Note by Mr. Charles M'Intosh, Inver.—The season was, on the whole, not favourable for the growth of fungi. There were, however, some exceptions, as, for example, *Agaricus* (*Amanita*) *rubescens*, an early species, which appeared luxuriantly in the beginning of the season. Later on, *A.* (*Tricholoma*) *imbricatus*, *A.* (*Clytocyhe*) *nubularis*, and *A.* (*C.*) *clavipes* appeared in fair condition. *A.* (*Amanita*) *muscarius* came late, and somewhat stunted or deformed. Several other familiar fungi did not appear at all, or but rarely, as *A.* (*Lepiota*) *procerus*, *Boletus luteus*, *B. elegans*, *B. luridus*, and *B. scaber*. There was an abundance of wild fruits and seeds of all sorts, but the cones of the larch were hardly so rich as might have been expected. Cowberry (*Vaccinium Vitis-idæa*) and Blaeberry (*V. Myrtillus*) were abnormally abundant on the higher ground, so much so, indeed, that although in ordinary seasons the birds soon finish them, this season they were left to decay on the bushes in great quantities. The River Tay at Inver fell almost as low in August as it has been known. On 4th October, 1894, the record was the lowest since 1826, and on 25th August, 1899, the water fell within half-an-inch of the mark made in 1894.

BRITISH MUSEUM
NATURAL HIS Y.



ANDREW COATES.

14th December, 1899.

JAMES BRIDGES, Vice-President, in the Chair.

The following papers were read:—

1. "The Tertiary Dykes of Scotland." By R. Dow, Longforgan. Illustrated by a series of lantern slides.

2. "On the Occurrence of Plutonic Complexes at Tomnadashan, Loch Tay, and at Cairn Chois." By P. Macnair, Glasgow. (See *Trans.*, Vol. III., Part II., page 43.)

11th January, 1900.

HENRY COATES, F.R.S.E., President, in the Chair.

The following papers were read:—

1. "A Day with the Terns." By Lieut.-Col. W. H. M. Duthie, R.A., Doune. (See *Trans.*, Vol. III., Part II., page 49.)

2. "Bird Life on the Sidlaws." By William Whyte. (See *Trans.*, Vol. III., Part II., page 55.)

8th February, 1900.

HENRY COATES, F.R.S.E., President, in the Chair.

The following papers were read:—

1. "The Alpine Flora of Clova." By Miss Millicent Thomas. (See *Trans.*, Vol. III., Part II., page 60.)

2. "Plant Associations of the Tay Basin." Part II. By Robert Smith, B.Sc., Dundee. (See *Trans.*, Vol. III., Part II., page 69.)

8th March, 1900.

THIRTY-THIRD ANNUAL MEETING.

SIR ROBERT PULLAR, F.R.S.E., in the Chair.

THE LATE MR. ANDREW COATES.

Mr. Barclay read the following Obituary Notice:—

SIR ROBERT PULLAR, LADIES AND GENTLEMEN,—Since our last Meeting the Society has lost, through the death of Mr. Andrew Coates of Pitcullen, one of its oldest members, and one of its chief supporters. Our Society is not the only one which has suffered by this sad event. Every Association in the town which worked for the welfare of the community, whether its aim were to help the needy or the aged, to

care for the orphan, to aid the sick and suffering, to shed light on the darkness of ignorance, or in any other way to minister to the public good, has lost in him a powerful and steadfast friend. Mr. Coates became a member of the Society so far back as 1869, and, during the long period which has since elapsed, he has taken an active part in administering its affairs. Though not a working naturalist—the cares of business did not permit of that—he had a very high opinion of the value of natural science, and took a great interest in its progress. That this interest in the study of nature was acquired in youth may be inferred from the interesting paper entitled "Personal Reminiscences of Audubon" which he contributed six years ago to our *Proceedings*. Whatever proposal was at any time brought forward for extending the usefulness of the Society received his heartiest support. To the building of the original museum he gave most generous aid, and when a few years ago it was proposed greatly to enlarge and extend it, his powerful influence and ready liberality contributed very greatly to the successful carrying out of the proposal. Throughout the whole life of the Society he has always been at hand in times of trial and difficulty, a capable adviser and a ready helper. And then the man himself. It was not possible to come in contact with him without forming the highest estimate of his unselfish character, his clear good-sense, and his earnest desire to benefit his fellow-men. In him the kindly heart prompted the kindly deed, as well as the kindly word which doubled its value.

Mr. Barclay then proposed, in name of the Council of the Society, the following resolution, viz. :—"That the Society record in their Minutes the keen feeling of regret and bitter sense of loss with which they have heard of the death of Mr. Andrew Coates of Pitcullen. A member of the Society almost from the beginning, he took an active part in administering its affairs. His wise counsel, founded upon wide experience, helped greatly in guiding the Society safely through times of difficulty. Since the building of the Museum he has acted as one of the Trustees, and without his generous aid, always freely given, the Museum Buildings could not possibly have been so complete or so well equipped as they now are. The study of natural science had in him a steadfast friend, and to help it on he was ever ready to make use of the great influence which his high character, his active mind, as well as his kindly heart and open hand, enabled him to exert over all classes of the community. Further, that the members of the Society desire to express how deeply they sympathise with Mrs. Coates and the other members of the family in the sad loss they have sustained. That the Secretary be instructed to forward a copy of this Minute to Mrs. Coates."

Sir Robert Pullar seconded the above resolution, which was unanimously adopted.

A letter was read from the President, Mr. Henry Coates, offering to present to the Society his collection of Mollusca. A vote of thanks was awarded to the President for his valuable gift.

Mr. James Coates and Major Drummond Hay of Seggieden were appointed Trustees of the Society.

The following reports were read and adopted :—

REPORT OF COUNCIL.

Your Council, in submitting their Thirty-third Annual Report, are again pleased that they are able to submit one of a favourable nature.

Six Monthly Meetings have been held during the year, at which 9 papers were read, in addition to the 2 usual Addresses of the President—the one at the Annual Meeting and the other at the opening of the Winter Session.

The attendance at the Meetings has not shown much fluctuation, though the average, 35, is somewhat smaller than last year. The greatest number at one Meeting was 45, on 8th February, 1900, and the lowest 26, on the 9th November, 1899.

There have been 27 Ordinary Members added to the Roll during the year, making a total Membership of 402, including 1 Honorary Member, 11 Corresponding Members, 6 Associates, 15 Associate Members, and 369 Ordinary Members. The total shows a reduction of 8 on last year, but this is more than accounted for by the decrease in the number of Associate Members, which has fallen from 39 to 15. Your Council regret this very much, as they had hoped this class of Membership would have been a continually increasing one.

During the summer months 8 Excursions were held, and were fairly well attended. One to Ben Ledi was in conjunction with the Scottish Natural History Society of Edinburgh, with whom a pleasant day was spent. Your Council expect that the Members of this kindred Society will, during the summer, come to see our Museum, and it is hoped that a large number of our Members will meet here to welcome them. It is intended also to arrange a short Excursion in the immediate neighbourhood for their benefit. Your Council again tender their thanks to those gentlemen who kindly gave permission for some of these Excursions taking place over their properties, as well as to the leaders and all who contributed to their success.

At last Annual Meeting the President again offered prizes for a Children's Essay Competition, which has proved even more successful than the former one, the number of Essays sent in this year being 70, as against 45 last year. Dr. Calman, of Dundee, has again adjudicated upon these Essays, and has sent in a very favourable report. The results were announced and 14 prizes distributed to the successful competitors at a meeting held here on the 3rd March. These Competitions have been an inducement to large numbers of children to visit the Museum, and your Council believe that the influence upon many of these boys and girls must be of a beneficial nature in encouraging an interest in and a love for the study of natural objects.

Another Course of Lectures on Historical Geology and Palæontology is being delivered by Mr. Corr, of Dundee, and is being fairly well attended.

The Council have joined with the Sandeman Public Library in the issue of a Quarterly Magazine, giving a record of the work of these two institutions. Two parts have already appeared.

Your Council again regret to have to record the removal by death of some old and valued Members. A few months ago we lost Mr. John Campbell, Optician, who was elected in 1881, and who at one time was a very active Member of the Society; and just recently there has passed away Mr. Andrew Coates, a much older Member, elected in 1869. For a long time Mr. Coates was one of the most regular attenders at the Meetings. Elected to the Council in 1874, he served continuously till the last, first as Councillor, then as Vice-President, and, on the erection of the present building, as a Trustee, and ever took the most active interest in the Society's work; and your Council feel they have lost one of their most generous, efficient, and trusted leaders.

The Council desire to record their appreciation of the services rendered to the Society by Mr. John Stewart, who has acted as Treasurer for the last 16 years, and who is now retiring.

The use of the Lecture Room has again been granted to various local Societies for Meetings in the evening. During the day it is being used for teaching purposes, your Council having readily agreed to a request made early in the summer by the School Board of Perth for its use during the erection of the new Central District School.

During the year the Museum has been visited by 8000 people.

REPORT OF TREASURER.

(See Balance-Sheet, page lxxi.)

REPORT OF TREASURER OF MUSEUM FUND.

(See Balance-Sheet, page lxxii.)

REPORT OF CURATOR.

The additions to the Museum collections have been announced, and the more important donations have been exhibited, at the Ordinary Monthly Meetings. The most important donation was from the Trustees of the British Museum, and comprised over 70 species from the Collections of the Challenger Expedition. A complete list, however, will be found at the end of the Society's *Proceedings* for the year.

Last autumn the Committee of Management of the Sandeman Public Library invited this Society to combine with them in publishing a Quarterly Report, in which notes on recent acquisitions by each of the Institutions might be brought more prominently to the notice of the public. In the two parts already published will be found the more important additions to the Perthshire Natural History Museum, with short notes on the chief points of interest which these exhibit. It is therefore unnecessary to say more about the donations, further than to thank the many kind donors for their gifts.

I pass on now to an account of the Museum work which has occupied my time since last year.

Perthshire Museum.— I described last year a form of glass-topped insect store box, with grooved sides, which is interchangeable along the whole of the north wall cases of the gallery, to contain our local Insect Collections. To this series 45 trays or boxes have been added, to accommodate the *Hemiptera* and part of the *Lepidoptera*.

Continuing along the east wall, I have had made a series of trays, the bottoms of which project half-an-inch along each side, and fit into corresponding grooves in the sides of the presses. This series of trays is interchangeable along the east wall, and will accommodate ultimately our additional and duplicate Rock, Mineral, and Palæontological local collections. Temporarily I have arranged zoological reference and duplicate specimens in them. These were previously packed away or stored in various cupboards, with no attempt at systematic arrangement.

Index Museum.—The group "Worms," including the *Polyzoa* and *Brachiopoda*, is being arranged in the wall cases 5 and 6, and is slowly nearing completion. I may mention I have for the first time employed the hand-press for the printing of small descriptive labels for this group. The classification used is that given in the *Cambridge Natural History*.

The Fishes, which are to have 4 cases to illustrate their affinities and general anatomy, have received a considerable amount of attention. They are being arranged in the north upright case, facing the Birds. The first case, dealing with the simplest forms of vertebrate animals, leading up to the *Elasmobranchii*, or Cartilaginous Fishes, is finished, so that, having other 3 cases yet to do, I reserve my remarks till a later date.

At the end of the Invertebrate cases (13) a series of specimens have been mounted and grouped showing various interesting points in the study of Birds, such as broad and narrow wings in birds of flight; the wing of a Penguin, as an example of a flightless bird; section of a wing, to show hollow bones; a skeleton; the various forms of feet as in running, scraping, perching, grasping, wading, swimming, etc.; the various colours, sizes, and shapes of eggs; the different forms of nests; a series of heads, to show variety in form of beak; and three types of skulls, with the corresponding bones of the palate in each coloured with the same tint to emphasise their shape and position—an important character in the classification of birds.

The Mammal cases have been re-arranged, and printed labels descriptive of each order introduced. The glass shelving is retained in this series in the meantime.

The Double Table Case (C. D.), containing the Rock specimens, is now completed. For a description of the arrangement and purpose of this collection I may refer to the Opening Address of the President, delivered at the beginning of the present session.

Lastly, our collections of Exotic, Land, and Fresh Water Shells have been identified and named. I am therefore in a position to go on with the arrangement of Table Case H.

Number of visitors to Museum—March 9th, 1899, to March 8th, 1900—8,210.

REPORT OF LIBRARIAN.

The Librarian reports that during the past year 247 volumes have been added to the Library by gift, and 45 volumes by purchase. Many of these works are of a valuable nature, and many are of great interest to the general reader. The Library is now reaching an important point of efficiency both in its lending and reference departments, and it is therefore to be hoped that still greater advantage will in the future be taken of it by the members. The number of readers during the year has been 53, and books borrowed 173. The increasing dimensions of the Library may be readily perceived from the extra shelving which it has been found necessary to erect.

REPORT OF EDITOR.

The First Part of Vol. III., New Series, of the *Transactions and Proceedings* of the Society has been published and issued to Members during the year. Copies of the Society's *Transactions and Proceedings* have been sent to 21 Institutions (British and Foreign), and in exchange we have received many valuable additions to the Library.

The following Office-Bearers were elected :—

President—Henry Coates, F.R.S.E.
Vice-Presidents—Dr. Andrew Thomson, F.R.S.E., F.C.S., F.I.C., James Morison, Robert Brown, F.E., R.N., Col. Campbell.
Secretary—S. T. Ellison.
Treasurer—Alfred Brown.
Librarian—James Coates.
Editor—William Barclay.
Councillors—The Right Hon. the Earl of Mansfield, James Menzies, Miss M. Thomas, L.L.A., Miss Macnab, L.L.A.
Curator—Alex. M. Rodger.

The following paper was read :—

"Books and Reading." By John Minto, M.A., Sandeman Public Library.

12th April, 1900.

HENRY COATES, F.R.S.E., President, in the Chair.

A letter was read from Mrs. Coates thanking the Society for their expression of sympathy on the death of her husband, the late Mr. Andrew Coates of Pitcullen.

Professor D'Arcy W. Thompson, C.B., of University College, Dundee, gave an interesting notice of some of the more notable

species represented in a large collection of Bird Skins from Ecuador, South America, lately presented to the Society by Mr. Archer Harman.

Mr. W. S. Bruce, of the Royal Scottish Geographical Society, gave an account of a proposed Scottish National Expedition to the Antarctic Regions, and thanked the Society for consenting to give their aid in carrying out the proposal.

The following paper was read :—

"A Contribution to the List of Perthshire Spiders." By W. Evans, F.R.S.E., M.B.O.U., Edinburgh. (See *Trans.*, Vol. III., Part II., page 88.)

The President delivered the following Address :—

Ladies and Gentlemen,—During the past year, death has been busy amongst the Members of our Society. Even since last Meeting another of the links which connect us with the past has been broken by the death of Dr. Buist, who passed away on the 17th of last month. Dr. Buist was one of the fourteen gentlemen who met in King James the Sixth's Golf Club, in Charlotte Street, on 28th February, 1867, to inaugurate this Society—"For the Practical Study of Natural Science in Perth." Five years ago, when I prepared the Memoir of the late Dr. Buchanan White and of his early connection with our Society, four out of these fourteen founders were still with us. Now, only one survives. During recent years, Dr. Buist did not take an active part in the work of the Society, but the earlier records show that at one time he took a considerable interest in Natural History, and especially in ornithology, and on more than one occasion he exhibited specimens of birds and of eggs at the Meetings.

SEASONAL NOTE.

The only seasonal note which I wish to record on the present occasion is with reference to the effects of the blizzard which occurred on Thursday, the 15th February. Having occasion to travel up the Highland line a few days afterwards, I was struck with the very peculiar havoc which had been wrought amongst the trees. Large numbers, especially in the Murthly and Dunkeld districts, had their tops broken off, just as if a giant hand had passed over the woods and snapped the branches across. The oaks and birches seemed to have suffered most, and many were broken in two, with the upper half still hanging by shreds of white timber. The lower branches had hardly suffered at all, and very few trees were entirely uprooted. This peculiar result appears to have been produced by a combination of circumstances. Before the wind reached its height, snow and sleet had been falling heavily, and freezing as it fell, so that the upper branches of the trees, besides being bent down by the weight of frozen snow, presented a solid surface to the force of the wind. In

addition to this, the previous frost had frozen the sap of the wood, and rendered it particularly brittle. Thus, when the storm swept along the valley of the Tay, the frozen and over-burdened upper branches had to give way.

CHILDREN'S ESSAY COMPETITION.

The only other matter to which I wish to refer, before proceeding to the subject of my address, is the Children's Essay Competition, and this I do chiefly for the purpose of recognising the very arduous part which our Curator, Mr. Rodger, took in organising the Competition, and especially in giving the children preliminary courses of instruction in front of the Museum cases. The thoroughness with which the competitors had taken in the lessons thus taught was evident when one read through the essays.

To those who believe that a knowledge of Nature is not the least important part of a child's education, it must be a matter of satisfaction that so many children in our town and county have given evidence of an intelligent interest in the study of animal life, and that, not under scholastic compulsion, but from an evident love of the subject. In order to show how well the general plan of the Museum was grasped, I may quote the following introductory sentence from one of the Essays:—"The Perthshire Natural History Museum contains the animals, birds, fish, plants, and rock formations which are found in Perthshire and round the Basin of the Tay; but the Index Museum contains animals from all parts of the world, in order to illustrate the divisions of the animals which are found in Perthshire." This, in juvenile language, is about as good a definition of the distinction between the two departments as we could wish.

Some of the young students, however, were not content with the information which they obtained in the Museum alone, for I know of at least one country district in which all the works on Natural History, both in the village library and in private collections, were "commandeered" for this special service. I do not know whether Mr. Minto had a similar experience at the Sandeman Library, but, if not, perhaps he will take the hint and provide some books on "Bird Life" for his Juvenile Department, in anticipation of a "Raid" during the coming season, when "The Legs, Feet, and Bills of Birds" will be the subject of study for the next Essay Competition. The conditions will be the same as formerly, and the Essays, which are to be illustrated with drawings, must be ready by the end of the present year.

The following is a List of the Prize-Winners for the past season:—

SENIOR DIVISION (Age 14 and over—8 Essays):—

1. Christina Cuthbert, Royal Grammar School, Dunkeld.
2. Malcolm M'Gillewie, do. do.
3. Elizabeth H. C. Mackenzie, do. do.
4. Edith A. H. Macgregor, do. do.

MIDDLE DIVISION (Age 13—30 Essays):—

1. Donald I. M'Gillewie, Royal Grammar School, Dunkeld.
2. William Sanderson, do. do.
3. Bethia M. Rodger, Western District School, Perth.
4. John T. Keay, Sharp's Institution, do.
5. George Macgregor, Caledonian Road School, do.

JUNIOR DIVISION (Age 12—32 Essays):—

1. Marguerita A. Mackay, Royal Grammar School, Dunkeld.
2. James Hutton, do. do.
3. James Martin, Southern District School, Perth.
4. Gracie H. Gall, do. do.
5. John M'Cowan, Caledonian Road School, do.

In my last Annual Address I treated Geology, and especially the Geology of Perthshire, from an æsthetic standpoint. This year I propose to do the same with regard to

THE WOODLANDS OF PERTHSHIRE.

There is no feature of the Natural History of our county which is more conspicuous than its tree-flora, and yet only two papers have been brought before our Society dealing with this subject. One of these was a paper on "The Native Timber Trees of Perthshire," read by the late Mr. William Lindsay in 1885, and dealing almost exclusively with the economic properties of the different timbers; while the other was the elaborate paper by Mr. Robert Smith on "Plant Associations of the Tay Basin," the first part of which was read two years ago, and the second part during the present session. Mr. Smith's paper deals with the trees chiefly from the point of view of habitat and environment.

I shall not attempt a strictly botanical treatment of the subject, as, even if I were competent to undertake it, such a treatment would be out of place in an address like the present. I wish rather to treat the trees as I did the rocks last year, namely, as features of the landscape.

There is no county in Scotland—or, indeed, in Britain—which possesses such variety of woodland scenery as Perthshire does. Other counties certainly excel it in richness of deciduous wooding, in extent of pine forests, or in the development of individual species, but none can show such infinite variety of sylvan effect as our own.

Every artist knows that it is not the densest mass of foliage or the best nurtured specimens of arboriculture which produce the most pleasing effect in the landscape. It is rather the blending of tint and of form produced by the mingling of divers species, and under varying conditions of soil and climate, which produce the most picturesque results. It is just such varying conditions that we find in the district embraced within the bounds of our own county. Take, for example, the course of the river Tay, from its source in the western Grampians to the Carse of Gowrie. As I have pointed out in a former address on the Soils of Perthshire, we have, in the valley

floor of our river, soils derived from the most diverse sources, and varying accordingly in the flora they can support. Along the whole course of the river, therefore, we have a fringe of wooding which constantly varies in character, and this again differs from the wooding which characterises the hill slopes.

Of the trees which make up the arboriflora of Perthshire, nineteen species are believed to be truly indigenous. Leaving out of account in the meantime the natural orders to which these belong, we may divide them, according to their range of geographical distribution, as follows :—

The holly, gean, crab-apple, crack-willow, and yew have a range extending throughout the greater part of Europe and the north and west of Asia.

The bird-cherry, hawthorn, elder, grey sallow, hazel, alder, and aspen cover the same territory, but extend also into the north of Africa.

The rowan, birch, and juniper occur in the northern regions of Europe, Asia, and North America.

The ash is confined to Europe and the north of Africa, and the wych elm to northern Europe and Siberia.

The oak occurs throughout Europe and northern Africa, and extends eastwards into Asia Minor.

Lastly, the Scots fir is confined to Europe and northern Asia.

In addition to these nineteen indigenous species, many other trees have become so thoroughly acclimatised that it is difficult to realise that they have been introduced by the agency of man within historic time. Some of these are indigenous in the southern portion of our island, while others have been imported from more southerly climates. For example, the elm, the beech, and the lime have spread northwards from England; the sycamore has been introduced from the Levant, the white poplar from Flanders, the chestnut and the horse-chestnut from Asia, the larch from Germany, and the spruce from Norway.

The condition of our county, as regards the distribution of its wooding, has varied greatly in times past. At the time of the Roman Invasion,—that is to say, at the dawn of the historic period,—it was thickly covered with forests, which represented the gradual growth of ages, probably commencing with the close of the Glacial Epoch. These forests were largely made up of oak, Scots fir, birch, and hazel, remains of which are still found in a sub-fossil condition in our peat mosses, in the beds of lochs, and in the buried forest bed which occurs here and there interbedded with the estuarine clays of the Carse of Gowrie. In these forests lived many species of mammalia which have long since disappeared from the face of Europe, and in them also lived and hunted primeval man, with his implements of stone and his dug-out canoes, in which he navigated the waterways which intersected the otherwise tractless thicket.

During early historic times, and especially in the Middle Ages, a gradual destruction of these primeval forests took place, the timber being used for fuel before coal came into use, and also for building the wooden huts in which the people lived. During these ages no

compensating process of planting was going on, so that there were only the natural processes of reproduction—namely, by seeds scattered by wind, water, birds, etc.—to make up for the artificial losses produced by the advance of civilisation.

It thus came about that a century ago or more Perthshire, in common with the greater part of Scotland, was nearly denuded of its more valuable timber trees, and serious consequences to climate, health, and the condition of the soil were threatened. At this juncture, however, it came to be recognised by the legislature and by our landed proprietors that, if the value and productiveness of the land were to be maintained, a more conservative policy must be adopted, and the ravages of time made good by careful forestry. In this movement the proprietors of Perthshire took a leading part, and the results of their efforts we see, to a large extent, in the wooding which beautifies so many parts of our county to-day. In particular, John, Fourth Duke of Athole, was an enthusiastic arboriculturist, at a time when that art was in its infancy, and he spent much of his time, as well as large sums of money, in re-planting his vast estates with the most suitable trees. It was he who, at the beginning of the present century, first planted the larch in any considerable numbers in this country. It was nearly a century earlier—namely, in 1738—that the first specimens were actually brought to Scotland, but these, which were planted at Dunkeld and Blair-Atholl, were introduced more as exotic curiosities than with a view to practical arboriculture. The two so-called "Parent Larches" of Dunkeld still stand, after more than a century and a half, as souvenirs of this first attempt to introduce a tree which has now so thoroughly established itself on the flanks of our Highland hills.

We will now glance at the present distribution of the tree-flora of our county, in order to note the combined results of the original forestration and of the more recent introductions.

The trees—indigenous and introduced—of our county may be said broadly to occur under five sets of conditions. These are:—first, the more or less continuous plantations on the Highland hills; second, the scattered wooding of the Highland glens; third, the belt of wooding which fringes the river Tay and its tributaries during the greater part of its course; fourth, the tracts of wooding which occur in the lowland parts of the county; and, fifth, the individual trees which are scattered everywhere throughout the valley floors and in parks and cultivated fields. Under each of these conditions we find certain species, or series of species, predominating. With the exception of the larch and the spruce, it may be said that the indigenous species, such as the birch, Scots fir, rowan, hazel, oak, etc., predominate in the Highland parts of the county; while the introduced species, such as the beech, elm, lime, sycamore, chestnut, etc., are found in greater abundance in the lowland districts. This, of course, is accounted for by the fact that the native species are more or less boreal in their distribution, and therefore favour a habitat with northern or sub-alpine conditions, such as light soil, exposure to severe climatic conditions, etc. The introduced species,

on the other hand, are more southerly in their distribution, and less hardy in the conditions of habitat which they require for their proper development.

In the trees which fringe our watercourses we see, as we might expect, a mingling of the two classes, the distribution being largely effected by the action of the stream itself in carrying down the seeds from one region to another and throwing them at random on its banks.

I propose now, in conclusion, to glance at our woodlands at the different seasons of the year, noting particularly how each species has its own characteristic features by which it may be distinguished at any stage of its development. The annual cycle of change which takes place in our forest trees is, of course, familiar to all, but if we carefully note the progress of this cycle from month to month, or even from week to week, we shall find that it presents an infinitely greater variety of aspect than we were at first inclined to suspect.

Let us begin with the middle of winter, when plant function is at its zero. The deciduous trees are all bare of leaves, save for a few shrivelled and russet leaves that still cling to the younger beeches and oaks. Scattered through the woods, however, are two native species that still give patches of green to remind us of the tints of summer, namely, the holly and the Scots fir, the berries of the former giving points of brilliancy in the winter landscape. Now is the time to study the wonderful symmetry of branching and the character of the bark in the different deciduous trees. These, we shall find, are quite as characteristic of the various species as are the forms of the leaves themselves. Take, for example, a few isolated trees standing in the fields by themselves, where we can view them against the sky line. The oak we can at once distinguish by its powerful lower limbs, going out nearly horizontally from the trunk, and by the general angularity of the branching. The beech, apart from the smoothness of its bark, can be distinguished by the way in which the main limbs all branch off from the bole at about the same distance from the ground, and at a very slight upward angle. The tapering of the branches, also, is gradual and regular. The ash is more elongated in general outline, and has its branches arranged in a series of alternate curves and angles, the twigs turning upward at the extremities. The elm is similar in outline to the ash, but the twigs stand out more abundantly from the main stem. The sycamore is rounded in outline, and generally flattened on the top. The lime has a symmetrical outline, the branching being at moderate angles and gradually diminishing in size. In the Spanish chestnut, on the other hand, the branches diverge at wide angles, and rapidly diminish in girth. Many other examples might be given, but these will suffice to show how completely each species has a character of its own to exhibit even in winter, when, to the casual observer, they are apt to lose their individuality. Even in colouring they differ from each other, as in the greyish tints of the beech, the silver of the birch, the orange-brown of the plane, the dark umber of the oak, the paler brown of the ash, the red of the Scots fir, etc. To appreciate these

tints we must see them in mass, along the edge of the copse, lit up by the winter sun, and relieved by a sprinkling of snow.

With the gradual approach of spring the vital forces of the tree, which have never been altogether inert during the winter, begin to re-assert themselves, and very gradually a change comes over the face of the woodlands. Long before the last traces of winter have disappeared, however, the alders, hazels, and willows begin to hang out their golden-tasselled catkins, giving a promise of colour along the margins of watercourses. As spring advances, other of our native trees burst into flower, among the earliest being the gean, the bird-cherry, and the hawthorn. The first of these makes a glorious mass of delicate pink and white, which only lasts for a week or two, and then disappears with a shower of petals like a fall of snow. The bird-cherry makes a beautiful feature on the edge of a Highland copse, with its loose racemes of pure white hanging from the tips of the branches. Of our introduced trees, perhaps the most beautiful at this season is the larch, the young cones appearing like tips of the loveliest coral, and the leaves, when they first come out, being a delicate grass green.

By this time the buds of the deciduous trees are fast swelling and bursting as the rising of the invigorated sap through the vessels of the tree quickens all its functions into new life. At this stage the woodlands present an indescribable variety of delicate tinting, running through every shade of golden brown, russet, pink, yellow, and pale green, relieved only by the darker green of the pines. Perhaps the best place to study this spring tinting is the mixed wooding which fringes the upper reaches of the Tay.

Gradually, as spring merges into summer, the brown and golden scales which protected the buds disappear, the leaves expand and deepen in colour, and the brown skeleton whose graceful form we admired in winter becomes more and more hidden from view, until, by midsummer, the monotony of intense green becomes almost trying to the eye. This, however, does not apply equally to all trees. The ash, for instance, long retains its spring aspect of leafage, and never becomes very thickly clothed. The birch, also, with its tiny shimmering leaves, always presents a pleasing contrast to the more densely covered forest trees. Of the latter, the sycamore, perhaps, carries the densest mass of foliage.

The period of maximum foliage does not last very long, for soon Nature exhausts her resources, and the vital forces of the tree begin to wane. It is then, when the combined action of the sunshine on the chlorophyll of the leaf and of the sap from within have reached and passed their maximum, that those mysterious chemical changes take place which result in what is the chief glory of our woods, namely, their autumn colouring. Here again each species displays its own individuality. Take, for instance, the beautiful stretch of wooding which fringes the river Braan above and below the bridge at Inver. Here the most brilliant points of crimson are presented by the fern-like sprays of the mountain ash. The alders and hazels show a modest neutral tint of yellowish green. The beeches in the

park below are streaked with golden russet, and the sycamores with patches of brick-red. The ash has branches which have turned bright yellow, but the oaks are still a dull green, which, in time, will turn to yellowish brown. Here and there the pines stand out with heads of deepest blue-green, and stems that show purple in the evening sun.

Soon, however, the glories of crimson and yellow begin to fade, and a more uniform tinge of russet spreads over the woodlands, and then, by degrees, the brown skeletons begin to show themselves again more and more each day, as, one by one, the leaves lose their vital connection with the organism which gave them birth, and fall to the ground to mingle their substance with the inorganic dust once more.

At the conclusion of the Address a number of beautiful slides were exhibited, illustrating the Woodlands of Perthshire.

PHOTOGRAPHIC SECTION.

The following Meetings were held during the Winter Session :—

23rd November, 1899.

Demonstration on Bromide, Gravura, and Velox Printing. By C. F. S. Burrows.

28th December, 1899.

Demonstration on Retouching. By A. Nicol.

25th January, 1900.

Demonstration on Lantern Slide Making. By H. Coates.

22nd February, 1900.

Exhibition of Members' Lantern Slides, including a series of views of Bird Life on Ailsa Craig, by Chas. Kirk, Glasgow.

22nd March, 1900.

Demonstration on Photo-Process Engraving. By E. J. Carver, Glasgow.

26th April, 1900.

Paper on "Photographic Pastimes." By J. Sime.

COURSE OF LECTURES ON GEOLOGY.

A Course of Six Lectures on Historical Geology and Palæontology, or, "The Story of the Earth and its Inhabitants," was delivered in the Lecture Room by Mr. James B. Corr, Dundee, as under :—

Lecture I.—2nd February, 1900.

"The Dawn of Life on the Earth."

Lecture II.—9th February.

"The Old Red Sandstone, or the Age of Fishes."

Lecture III.—16th February.

"The Floral Aspect of the Palæozoic Period."

Lecture IV.—23rd February.

"The Reign of the Cephalopoda and the Reptilia."

Lecture V.—2nd March.

"The Immediate Ancestors of our existing Fauna."

Lecture VI.—9th March.

"The Advent of Man."

LIST OF DONATIONS TO THE MUSEUM AND LIBRARY,

From 1st April, 1899, to 31st March, 1900.

I. PERTHSHIRE COLLECTION.

Garnetiferous Schist—Mr. J. B. Deas.
Iron Pyrites, two large crystals—Mr. Charles M'Intosh, Inver, Dunkeld.
Rose Quartz—Mrs. Gray.
Galena, from a quartz vein in mica schist—Mr. W. Kerr, Crieff.
Kilpatrick Quartz—Mr. W. Kerr, Crieff.
Blend, associated with Galena—Mr. W. Kerr, Crieff.
Galactite (Nitrolite)—Mr. W. Kerr, Crieff.
16 Geological Specimens from Newtyle Hill, Dunkeld—Messrs. Coates and Rodger.
Yew, cross section—The Earl of Mansfield.
Agaricus (Amanita) lenticularis—Mr. Charles M'Intosh, Inver.
" " " (Coloured Drawing)—Miss Drummond Hay, Seggieden.
Curlew—Mr. Charles M'Intosh, Inver, Dunkeld.
Spiders, a number of—Mr. Wm. Wylie.
Salmon Smolt—Mr. A. H. Lumsden.
Sea-Trout, Whitling—Mr. A. H. Lumsden.
Pike—Mr. A. Gray.
Crested Grebe—Mr. J. Crockart, Blairgowrie.
Spongilla fluviatalis—Mr. A. Gray.
Mallard Duck (male), in eclipse plumage—Colonel Campbell.
Hemiptera, *Pentatoma baccarum*, 10 specimens of—Mr. A. Brown.
Young Sheldrake—Capt. Bald, Invermay.
Deathshead Moth, chrysalis—Mr. C. T. MacFarlane, Cargill.
Missel Thrush (male)—H. Coates, Esq.
House Martin—Mr. James Laidlaw.
Roedeer Head (male), malformed horns—Mr. James Keay, Murthly.
Scaup Duck (young)—Capt. Bald, Invermay.
Waterhen (adult male)—Mr. James Dow, Clathybeg.
Beetles, 68 specimens—Mr. Wm. Wylie.
Diptera (flies), 60 specimens—Mr. Wm. Wylie.

II. INDEX COLLECTION.

Cyanite, Glenrinnes, Banffshire—Mr. Wm. Barclay.
Pegmatitic Granite, Rubislaw—Mr. D. Gow.
Rock Specimens from Strathpeffer, a number of—Mr. Charles M'Intosh, Inver.
Geological Specimens, 28—Mr. P. M'Nair, Glasgow.
Granite, containing Sylvanite or Telluride of Gold, Colorado—Mr. W. Weston.
Photo Micrographs of Rock sections, 12—Mr. J. B. Corr, Dundee.
Rock Specimens, 8, for Index Case—Mr. R. Kidston, Stirling.
Eucalyptus (red gum), section of wood, Victoria, Australia—Mr. D. Gow.
Black Ebony, section of wood, Victoria, Australia—Mr. D. Gow.

Wing of Penguin—Prof. D'Arcy W. Thompson, C.B.
Snowy Owl, Davis Straits—Capt. Wm. Milne.
Iceland Falcon, Davis Straits—Capt. Wm. Milne.
Waxwing—Mr. Charles Kirk, Glasgow.
Chamois, a coloured sketch—Sidney Steel, Esq.
Australian Shells, a number of—Miss Jamieson.
Brachiopods, Silurian—Exchange from Worcester Museum.
Euplectella (*Venus flowerbasket*) Sponge, a number of, Cebu.—Mr. Hamilton Fleming.
Polar Bear Skulls (male and female), Davis Straits—Capt. Adams.
Arctic Wolf Skull, Davis Straits—Capt. Adams.
Starfish (*Goniaster equestris*), Gmelin.—Messrs. Speedie.
Duplicate Specimens of the "Challenger" Expedition from the British Museum:—
Sponges, 13 species.
Cœlenterates, 3 species.
Echinoderms, 17 species.
Polyzoa and Brachiopods, 5 species.
Molluscs, 18 species.
Fish, 16 species.
Birds, 1 species.
Eggs of Snow Bunting, Lapland Bunting, Sandpiper, Raven, Black Guillemot, Red-breasted Merganser; Ermine (winter and summer fur), and a number of Marine Animals—Long-tailed Duck, King Eider Duck, Eider Duck, Peregrine Falcon, Iceland Falcon, Sabine Gull, Arctic Wolf, Skull of Polar Bear, and Ockduke Seal; Davis Straits—Capt. Wm. Milne.
Pheasant, with very pale plumage—Mr. James Keay.
Nest of Fieldfare and Eggs, Norway—Lieut.-Col. Duthie.
Nest of Trap-door Spider, Species of Shells, an Exotic Beetle and Dragonfly, also a number of Maps and Labels—Exchange, Owen's College Museum.

III. LIBRARY.

Museum of Natural History, American, Bulletin of the, Vol. X.—The Museum.
Larvæ of British Butterflies and Moths, Vol. VIII.—Ray Society.
Academy of Natural Science of Philadelphia, U.S.A., Proceedings of the, Part III., 1898; Part I., 1899; Part II., 1899.
Insects, Foes and Friends, Kirby—H. Coates, Esq.
Berwickshire Naturalists' Club, Proceedings of the, Vol. XVI., Part II., 1897—The Society.
Session-Book of Bonckle Naturalists' Club, 1899—The Society.
Smithsonian Institute Annual Reports, U.S.A., 1895-96—The Institute.
Nova Scotia Institute of Science, Vol. IX., Part IV., 1897-98—The Institute.
Northampton Natural History Society, Journal of the, Nos. 73-6 incl.—The Society.
Royal Physical Society of Edinburgh, Proceedings of the, Session CXXVII.-CXXVIII.—The Society.
North American Fauna, No. 14—U.S. Department of Agriculture.
Agriculture, Year-Book of the Department of, 1898, U.S.A.—The Department.
Manx States, Palæontology of the, Publication 27, Owen's College—The Museum.
Owen's College, General Guide to the Natural History Collections, Publication 26—The Museum.
Linnæus, Index to the Systema Naturæ of, Owen's College, Publication 25—The Museum.
Museums' Association, Report of the Proceedings of the, 1898—The Association.

Geological Society, Quarterly Journal of the, Nos. 70, 80, 84, 87, 91, 155, 157, 165, 167, 168, 170, to complete our set—The Geological Society.

Fishery Board of Scotland, 17th Annual Report, Part III.—Scottish Fishery Board.

Missouri Botanical Garden, 10th Annual Report—The Directors.

American Museum of Natural History, Annual Report, 1898—The Museum.

On the Carboniferous Volcanic Rocks of the Basin of the Firth of Forth—Sir Arch. Geikie.

Essex Naturalist, Vols. VIII., IX., X.; Nos. 1, 2, 3, Vol. XI.—The Field Club.

Essex Naturalist Field Club, Transactions of the, Part I., Vol. IV.—The Field Club.

North American Fauna, No. 15—U.S.A. Department of Agriculture.

Botanical Society of Edinburgh, Transactions and Proceedings of the, Vol. XXI., Parts I., II., III.—The Society.

172 Volumes Zoological and Botanical Works—Mr. G. L. Moffat, M.A., being part of the library of his father, the late Andrew Moffat, Edinburgh. The works date from 1696-1841, and include, among others, the writings of Ray, Linnæus, Cuvier, Buffon, Pennant, Fleming, Lightfoot, Don, De Candolle, etc.

Board of Agriculture, Leaflets of the, Nos. 56, 60, 61—From the Secretary, Board of Agriculture.

American Museum of Natural History, Bulletin of the, Vol. XI., Part II., 1899—The Museum.

Anales Musco Nacional de Montevideo, Tome II., Fac. XII.—The Museum.

Nottingham Naturalists' Society, Annual Report of the, 1898-9—The Society.

Wisconsin Academy of Science, Arts, and Letters, Transactions of the, Vol. XII., Part I.—The Society.

Parka Decipiens—Mr. D. P. Penhallow.

British Farmers' Plant Portfolio—Mr. J. Milne.

American Notes—George Combe.
Science and Religion—George Combe.
Moral Philosophy—George Combe.
Constitution of Man—George Combe.
Discussions on Education—George Combe.
The Management of Infancy—Andrew Combe.
Biological Experimentation—Sir B. W. Richardson.
} The Combe Trustees.

British Association, Report of the Meeting at Dover, 1889—The British Association.

21 Works on Insects, part of Dr. Buchanan White's Library.
Many volumes, including 17 vols. Entomologist, 18 vols. Entomological Society's Transactions.
The Journal of the Linnean Society—
Zoology, No. 49, 1870; No. 156, 1893.
Botany, No. 65, 1871; No. 209, 1894.
The Transactions of the Linnean Society—
Zoology, } number of parts.
Botany, }
Annales de la Societé Entomologique de France, 1871-1874.
} Mrs. Buchanan White.

Science Gossip, 1899—H. Coates, Esq.

The Boyhood of a Naturalist, by the Rev. F. Smith—H. Coates, Esq.

Nature, 1899—Mr. R. Kidston.

Scottish Geographical Society Magazine, 1899—Andrew Coates, Esq.

British Annelids, Part II., Polychæta—Ray Society.

Geological Survey of Canada, Vol. X., Annual Report—Canadian Government.

Science Gossip, 1865-6-7—Mr. Jas. B. Corr.

Smithsonian Report, U.S.A., 1893, Part II.—H. Coates, Esq.

ADDITIONS TO THE ROLL OF MEMBERSHIP

DURING WINTER SESSION 1899-1900.

ORDINARY MEMBERS.

Campbell, Andrew B., 41 George Street, ...	12th April, 1900
Coats, Archibald, Battleby, Redgorton, ...	14th December, 1899
Coats, Miss M. G., Battleby, Redgorton, ...	14th December, 1899
Coats, Mrs. W. H., Battleby, Redgorton, ...	14th December, 1899
Dodson, Charles, 29 Queen Street, ...	12th April, 1900
Douglas, Henry, City Chamberlain's Office, ...	11th January, 1900
Hay, Miss Drummond, Seggieden, ...	14th December, 1899
Kaye, William, Craigie Public School, ...	12th April, 1900
Kenna, Miss Matilda, 92 Paradise Place, ...	12th April, 1900
Kenna, Miss Maggie, 92 Paradise Place, ...	12th April, 1900
Leslie, Hugh, Kinnoull Public School, ...	12th April, 1900
Lowe, Miss, Charlotte Place, ...	12th April, 1900
Manuel, Rev. D. G., M.A., B.D., Balhousie Terrace,	14th December, 1899
Myles, Miss M. L., 2 Laurel Bank, Bridgend, ...	14th December, 1899
M'Pherson, Rev. H. A., The Priory, Pitlochry, ...	8th February, 1900
M'Naughton, Dr. W. A., Medical Officer of Health, Stonehaven, ...	14th December, 1899
Paterson, Wm., Central Public School, ...	14th December, 1899
Ritchie, W. E., Pitcullen Terrace, ...	14th December, 1899
Russell, David, Brae Lodge, Murrayfield, Edinburgh, ...	8th February, 1900
Scott, Miss Ina, Tulloch Public School, ...	8th March, 1900
Turpie, James, Depute Town Clerk, ...	8th February, 1900
Wingate, A. K. P., Underwood, Perth Road, Crieff, ...	8th February, 1900

SUMMER SESSION, 1900.

The following Excursions were arranged:—

1. Monday, April 16 (Spring Holiday).—St. Andrews. Geological and Photographic. Leader, Mr. J. B. Corr.

2. Saturday, April 28 (half-day).—Joint Meeting and Excursion with the Scottish Natural History Society of Edinburgh. Leaders, Mr. H. Coates and Mr. Alex. M. Rodger.

3. Monday, June 4 (Queen's Birthday).—Sma' Glen and Auchnafree. Leader, Mr. A. S. Reid, M.A., F.G.S.

4. Saturday, July 7 (Midsummer Holiday).—Ben Chonzie. Leader, Mr. S. T. Ellison. Meeting of the Mountain Club on the summit at two o'clock.

5. Saturday, July 21.—Banks of Garry, from Killiecrankie to Blair-Atholl. Leader, Mr. W. Barclay.

6. Saturday, August 4.—Rescobie Loch. Leader, Mr. Robert Smith, B.Sc.

7. Thursday, August 30 (Autumn Holiday).—Millhaugh and Banks of Almond. Leader, Col. Campbell.

BALANCE-SHEET of THE PERTHSHIRE SOCIETY OF NATURAL SCIENCE for the Year ended 28th February, 1900.

INCOME.

To Balance in Savings Bank at 28th February, 1899, ...	£1 12 11		
,, Balance in Treasurer's hands, ...	8 12 5		
		£10	5 4
,, Annual Subscriptions and Entrance Fees, ...		89	1 0
,, Life Members, ...		5	5 0
,, Contributions towards Expense of Coal and Gas,		5	17 0
,, Interest on Bank Account for Year, ...		0	1 0
,, Balance due to Treasurer, ...		0	14 0
		£111	3 4

EXPENDITURE.

By Proportion of Janitor's Salary, ...		£5	0 0
,, Fire Insurance, ...		7	0 0
,, Feu-duty, ...		11	6 1
,, Repairs and Furnishing, ...		2	12 11
,, Fuel and Gas, ...		16	16 4
,, Printing Society's *Transactions*, Stationery, &c.,		34	12 9
,, Books, Magazines, and Binding, ...		25	16 2
,, Postages and Petty Expenses, ...		3	3 2
,, Subscriptions to other Societies, ...		2	2 0
,, Balance in Savings Bank at 28th February, 1900,		2	13 11
		£111	3 4

PERTH, 7th March, 1900.—We have examined the foregoing Accounts for the year, with the relative vouchers, and find them correct. The sum in Savings Bank at the close of the year is £2 13s 11d.

(Signed) JAMES MORISON, WILLIAM BARCLAY, } *Auditors.*

BRITISH MUSEUM

PERTHSHIRE SOCIETY OF NATURAL SCIENCE—MUSEUM FUND.

ABSTRACT OF ACCOUNTS, Year ending 28th February, 1900.

INCOME.

Subscriptions and Grants, ...	£306	2	0
Collected per Box in Museum, ...	2	8	9
Specimens Sold, ...	5	0	0
Year's Receipts, ...	£313	10	9

EXPENDITURE.

Balance at debit, February, 1899, ...				£41	9	2
Salaries of Curator and Janitor,	£170	0	0			
Specimens and Models, ...	30	17	9			
Boxes, Tablets, Trays, &c.,	33	0	11			
Furnishings, ...	5	19	8			
Price of Ground acquired, 1892,	18	11	0			
Petty Outlays, ...	12	10	11			
Year Payments,				271	0	3
Balance in Treasurer's hands, Feb., 1900,				1	1	4
				£313	10	9

[This Part, pp. xli to lxxii, published 1st November, 1900.]

WINTER SESSION, 1900-1901.

8th November, 1900.

HENRY COATES, F.R.S.E., President, in the Chair.

Mr. Barclay exhibited specimens, and gave an account of three notable plants found during the preceding summer. These were—1st, *Asarum europaeum*, Lin., a large patch of which was discovered by himself on the bank of the Tay about three-and-a-half miles below Perth. Though certainly not native, it is difficult to account for the presence of the plant in this station. 2nd, *Linnaea borealis*, Lin.—This was found by Mr. Arch. Gray in a wood at some distance from Kinnoull Hill. The plant was in considerable qnantity, covering a space of ground 13 yards by 3 yards broad. There is an old record for *Linnaea* as having been found on Kinnoull Hill about 1820, but it is not known to have been gathered in that station or neighbourhood since. 3rd, *Schoenus ferrugineus*.—This species, first discovered as a British plant by Mr. Brebner, Dundee, at Loch Tummel in 1884, and occurring then in considerable quantity, was believed to have become extinct. This, however, is not yet quite the case, for Mr. A. H. Evans, Cambridge, gathered a few spikes of it this season. It is to be feared, however, that it will soon cease to exist as a British plant, a result greatly to be regretted and difficult to account for.

Mr. Alex. M. Rodger, as Delegate of the Society to the British Association for the Advancement of Science, gave a report of the Meetings of the Association at Bradford.

The following paper was read :—

"On Some Prison Birds." By Col. Campbell (See *Trans.*, Vol. III., Part III., page 97).

The President delivered the following Opening Address :—

LADIES AND GENTLEMEN,—It is now fifteen years since my predecessor, the late Dr. Buchanan White, inaugurated the custom of opening the Winter Session with an Address from the President. The custom has its uses in giving an opportunity for placing on record any matter of interest to the Society which may have occurred during the preceding Summer Session. At the same time, I think your Council has acted wisely in this year placing a Paper on the Agenda for the opening night, in addition to the Address, and thus giving me a hint to make the latter as brief as possible. This hint I shall certainly take.

THE MUSEUM.

Turning first to the Museum, I should like to draw your attention to some of the recent work of our Curator in the Index Department. As you are aware, the arrangement of this department was deferred

until the Perthshire Collection had been put in order. Now, however, the work is steadily progressing from case to case, and from division to division of the Animal Kingdom. In some of these I venture to say that the workmanship is not surpassed in any Museum in the kingdom, either as regards design or execution. In particular, the case illustrating the structure and classification of the fishes has won the admiration of several naturalists who have visited the Museum during the past summer.

Speaking of the Museum reminds me that we are now approaching the end of the period of five years during which the maintenance of the Museum was guaranteed by a few friends. When that period expires we must look to the Municipal Authorities to assume the responsibility for its upkeep, in conjunction with the Free Library. I believe it would be the feeling of the whole community that it would be nothing short of a calamity if what has now come to be recognised as one of the most popular institutions in the city had to close its doors to the public.

It will be noticed that a large proportion of the papers on our syllabus are on subjects bearing on bird life. This is appropriate at the present time, as the subject prescribed for the Children's Essay Competition for the present season is "The Legs, Feet, and Bills of Birds." I trust that a large number of school children will visit the Museum during the next two months with a view to studying for the competition, and that the number of essays sent in by 31st December will be in excess of those received last year. Special provision is made for drawing out the artistic talents of the competitors, as marks will be given for sketches illustrating the subject.

OBITUARY.

We have to deplore the loss by death during the past summer of two more of our members who have left their impress in our annals. These are James Keay, Gamekeeper, Murthly, and Robert Smith, B.Sc., Assistant to the Professor of Botany in University College, Dundee. The former was one of the foremost among that band of keen observers of Nature scattered in different parts of our county to whom we are largely indebted for our unique collection of the local vertebrate fauna. Living as he did in closest touch with wild Nature, and being possessed of exceptional intelligence, he was familiar with all the phases of animal life in his district. This was noticed particularly by the late Sir John Millais, who rented the shootings of Murthly for several years, and who was himself a true lover of Nature. His biographer, Mr. J. G. Millais, speaks of James Keay and his two assistants as "Quite exceptional men of their class, Highlanders of the very best type, in whom were blended all the finest qualities of unspoilt natures." And further,—"Of James Keay, a gentleman in everything but social rank, my father was particularly fond, and he always considered him one of the best men he ever came in contact with."

Of Robert Smith I may say that many of us, although we had only known him for a very few years, had come to regard him with

feelings of affection. One could not come in contact with him without realising that with him Nature was a mistress to whom he had given his whole heart, and that between him and those who shared this love with him there was a bond of comradeship. His researches had not, perhaps, extended over a very wide field, but the characteristic which most distinguished his work was its thoroughness. It was thorough both in its originality and in its insight into the problems of Nature. Although living in Dundee, he seemed to be much drawn towards our Society, and took an active part in the work of both the winter and summer sessions. Our *Transactions* are truly enriched by the two papers which he contributed on the "Plant Associations of the Tay Basin," which form a fitting sequel to the series of papers communicated by the late Dr. Buchanan White on the Plant-Geography of the County. The value of these papers is greatly enhanced by the very elaborate Map of North Perthshire which he prepared in illustration of the subject, and which we have fortunately been able to publish in the new part of our *Transactions* just issued. This map should prove of the utmost service to local botanists as a work of reference and as a basis for future investigations. As regards his personality, one could not be in his company without being drawn by his gentle nature. Such workers can ill be spared from the ranks of those who are striving to lead their fellowmen out of the sordid grooves of earthly toil, and the grief we feel at his loss is heightened by the reflection that he has been taken from us in the opening years of what seemed a career of promise.

SEASONAL NOTES.

The past summer, taken as a whole, has been characterised by its dulness and comparatively low temperatures, together with rather more than average rainfall. During the months of May, June, July, and August there was little continuous sunshine, the sky being generally clouded to a greater or less extent. For a week or ten days in the middle of September, however, exactly opposite conditions prevailed. The mean temperatures registered at Pitcullen during the summer six months were as follows :—

May, - -	49·4° F.	August, - -	56·6° F.
June, - -	56·1° F.	September, -	52·8° F.
July, - -	60·5° F.	October, - -	45·2° F.

The mean temperature for these six months was 53.4° F. The highest temperature was registered on 14th August, namely, 78° F.

The rainfall recorded at Pitcullen during the same period was as follows :—

May, -	1·65 inches.	August, -	3·98 inches.
June, -	2·61 „	September,	2·32 „
July, -	2·97 „	October, -	3·75 „

The total rainfall for the six months was thus 17·28 inches. The greatest rainfall within twenty-four hours was on 22nd August, namely, 2·14 inches. There were two weeks during which no rain

fell, namely those ending 19th May and 18th August. It will be noticed that the latter was the week which embraced the highest daily temperature.

Very little thunder has been heard during the past summer, and there have been no wind-storms of any consequence.

As regards the effects of these weather conditions on vegetation, it may be noted that the foliage on the deciduous trees was heavier than usual, and in autumn the change of tint and the fall of the leaf came rather suddenly. Most herbaceous plants, and especially grasses, were very luxuriant, and there was a considerable growth of young wood on trees and shrubs. Stone fruits, such as plums, and also small fruits, such as gooseberries and currants, were very abundant, but the crop of apples and pears was rather below the average.

I now turn, in conclusion, to

THE SUMMER EXCURSIONS OF 1900.

Although the season, as I have said, was dull on the whole, yet fortunately the days fixed for the excursions were generally fine. The attendance was about the same as formerly.

1. April 16, to St. Andrews. This excursion, which was held on the Spring Holiday, was conducted by Mr. J. B. Corr, of Dundee, who had delivered a course of lectures to us in the spring on Historical Geology. Most of the members of this class were present at the excursion, and also a small detachment of the Photographic Section of the Society. Mr. Corr sends the following report on the day's proceedings :—

"On arriving at St. Andrews, the Geological party started at once for the 'Rock and Spindle,' accompanied by Mr. Berwick of Stravithie, who kindly consented to conduct us over the grounds. On reaching the Sandstone cliffs, a search was made for fossils, and several good specimens of *Stigmaria ficoides* were obtained. These fossils, and the thin seams of coal observed here and there interbedded between the sandstones, showed that we were dealing with rocks of the Carboniferous Period. On reaching the 'Rock and Spindle,' an examination was made of this famous outlier of Volcanic Agglomerate and Lava. On our return journey a visit was paid to the Marine Laboratory of the St. Andrews University, where we had an opportunity of examining the collection of specimens illustrating the Marine Zoology of St. Andrews Bay. Leaving the Marine Laboratory, we directed our steps towards the University, and were admitted to the Museum. Here we spent a considerable time in looking over the extensive collections of Zoological, Geological, and Mineral Specimens. The Old Red Sandstone Fishes from Dura Den were greatly admired, while the numerous cases of fossils and minerals in the Geological Department received a considerable amount of attention.

"Having satisfied, as far as time would permit, our thirst for knowledge in the realms of Palæontology and Petrology, we

adjourned to the Royal Hotel, in order to appease our cravings in another direction, and, after having enjoyed an excellent tea, prepared for our return to the Fair City."

2. April 28, to the Museum and Kinnoull Hill. This afternoon excursion was arranged in fulfilment of a long-standing promise to the members of the Scottish Natural History Society of Edinburgh, in order to give them an opportunity of inspecting our Museum. Mr. Rodger, who had charge of the arrangements, reports as follows :—

"The members of the Edinburgh Society, to the number of twenty, arrived at the Museum shortly after four o'clock, when they were met by a good number of our own members, who attended to do honour to their guests, by whom we had been entertained on several previous occasions. The whole party was first conducted through the Museum by your Curator, who explained the general plan of the Local and Index Departments. They then broke up into smaller parties, which were conducted by members of our Society to the various sections in which they were specially interested. In this way a very pleasant and profitable hour was spent, after which all reassembled in the Lecture Room, where tea had been provided by our President, who, however, was himself unfortunately unable to be present. In his absence, Colonel Campbell welcomed the visitors on behalf of the Council of our Society. Mr. Dobbie, in returning thanks for the members of the Edinburgh Society, expressed the pleasure they had had in visiting the Museum, and their admiration at what they had seen.

"Before returning to the train, a hurried visit was paid to Kinnoull Hill, under the leadership of Mr. Barclay, and although there was not much time for anything in the way of botany or geology, the walk and the view were much enjoyed."

3. June 4, to the Sma' Glen. This excursion, which was held on the Queen's Birthday, was attended by a large number of members, including several members of the Photographic Section. The day was one of the finest of the whole summer, with brilliant sunshine, tempered by a cool breeze, and the long drive through the bracing Highland air was greatly enjoyed. The first halt was made at Newton Bridge, from which point it had been intended to proceed up Glen Almond as far as Auchnafree. It was found that there would not be time to go quite so far, but some hours were very pleasantly and profitably spent in the Glen above the Bridge. Both the Botanists and the Photographers were kept busy, the latter securing some beautiful views along the banks of the stream. Several interesting plants were got, including a number of ferns. In the afternoon the party drove home by Amulree and Birnam, a halt being made at Birnam Institute for tea. Perth was reached in the evening, after a thoroughly enjoyable day's outing.

4. July 7, to Ben Chonzie. This excursion took place on the Midsummer Holiday, and was led by Mr. S. T. Ellison, one of the

members of the Mountain Club connected with our Society. The following is the report of the leader:—

"The party, which comprised a considerable number of ladies and gentlemen, journeyed by rail to Crieff. They then drove up through the picturesque Glen Turret as far as the loch, and then set off to ascend the mountain. The first part of the way, before the actual climb began, was through the numerous ancient moraines which nearly fill up this part of the Glen, and which tell of a time when the climate of Scotland was very different from what it is now. The ascent of the Ben, though pretty stiff in parts, was not to be called difficult; and fatigue was forgotten in the pleasure of finding on the way several interesting plants, notably the beautiful *Linnæa borealis*, Lin., so rare in Perthshire, and, indeed, in Britain. Shortly after two o'clock the summit was reached, an altitude of somewhat over 3000 feet. Here a meeting of the Mountain Club was held. The Cairnmaster very shortly sketched the origin of the Club and the purposes for which it was instituted. The founder of it was the late Sir Thomas Moncreiffe, who also presented to the Club the handsome Quaich which is indispensable when new members are admitted. This is the first occasion on which ladies have been present at a meeting. The Cairnmaster then proceeded to initiate as new members six ladies and four gentlemen, the ceremonies prescribed for such an occasion being all duly performed. After a short rest to admire the splendid prospect from the top, the party proceeded downward, exploring on the way the numerous rocky ledges where plants might be looked for. Besides most of the commoner alpines, a large number of the rarer and more interesting ones were obtained. Amongst these were *Saussurea alpina*, D.C., *Veronica fruticans*, Jacq., *Cornus suecica*, Lin., *Carex vaginata*, Tausch., *Woodsia hyperborea*, R. Br. The beautiful *Potentilla rubens*, Vill., was particularly abundant and fine. A number of interesting mountain insects were also obtained. The weather was delightful—cool, breezy and bright; and after the toil of the day was over the drive back to Crieff was exceedingly pleasant. At Crieff the party had tea in the Royal Hotel, and then proceeded homewards by train, all agreeing that this was, perhaps, the pleasantest excursion for several years."

5. July 21, to the Banks of the Garry, from Killiecrankie to Blair-Atholl. Mr. Barclay, who was leader for the day, reports on this excursion as follows:—

"Alighting at Killiecrankie Station, the party first explored the rocky gorges of the Alt Girnaig. This was by no means easy, as the stream was swollen by recent rains, and the paths were broken down in many places, rendering the footing rather precarious. *Festuca sylvatica*, Vill., a rather rare plant in Perthshire, was found in plenty. The party then proceeded along the left bank of the Garry to Blair-Atholl. Plants worthy of note were *Origanum vulgare*, Lin., and abundance of *Rubus sanatilis*, Lin., with profusion of ripe fruit. Fungi were fairly plentiful, and a good number of interesting specimens were gathered. The weather was fine, and the excursion was a very pleasant one."

6. August 11, to Rescobie Loch. This was the last excursion led by Mr. Robert Smith, to whose lamented death I have already referred. As he is no longer with us, Miss M. Thomas has kindly supplied the following report :—

"At the close of the day, it was generally agreed that this excursion would be memorable as the most enjoyable we had ever had, but we little thought then that we should always remember it as the last time we should ever see the leader of the excursion, our friend and teacher, Mr. Robert Smith. His death, after a few hours' illness, a fortnight later, came as a great shock to all who had the privilege of knowing him, for to everyone he had greatly endeared himself by his upright character, his kindly disposition, and his great love of Nature.

"To botanists, Rescobie is most interesting ground, and Mr. Smith knew it extremely well, and inspired us with his enthusiasm. The whole day he taught us, pointing out, as we passed along, the different plant-associations on the road-side, explaining the interesting geological formation of the land, and, at the loch, the manner in which the various zones of vegetation arise according to the depth and nature of the bottom. We saw how, close to the shore, came a zone of *Eleocharis palustris*, R. Br. ; further out, in rather deeper water, a zone of *Phragmites communis*, Trin. ; still further out, a white Water Lily zone, and, in deeper water still, the zone of the yellow Water Lily.

"But the most interesting plant was what we had all come to see, viz., the Water Soldier, *Stratiotes Aloides*, Lin., so called from its Aloe-like leaves. As it was in flower, it was floating on the top of the water, and had to be got out by means of a kind of lasso thrown from the shore.

"Among the many interesting species that we brought home that day I may mention the following :—*Cicuta virosa*, Lin. ; *Utricularia vulgaris*, Lin., *Lysimachia thyrsiflora*, Ait. ; *Alisma ranunculoides*, Lin. ; *Zannichellia palustris*, Lin. ; *Ranunculus Lingua*, Lin. ; and several species of Potamogeton.

7. August 30, to Millhaugh and the Banks of the Almond. For this, the last excursion of the season, the Society was again favoured with exceptionally fine weather. The object was mainly geological, namely, to explore once more the plant remains found amongst the strata of the Old Red Sandstone, and there was a good muster of hammers. Several botanical members, however, were also present, and made good use of their time. The first point visited was a low cliff of shaley sandstone by the right bank of the river, about half-a-mile below the bridge, where, after some searching, the fossiliferous beds were found, and several good slabs were secured for the Museum. These fossil impressions represent the Algæ, or Sea-weeds, which flourished in the Old Red Sandstone lagoons, and belong to the genus *Psilophyton*. Some of the specimens secured showed very distinctly the scale-like leaves or bracts with which the stems were covered, aud also the branching of the stems, and their spirally-coiled terminations. Returning to the Bridge, the geologists next proceeded down the river on the other

side for a few hundred yards, where a bed of purer sandstone was found, also charged with similar plant remains. In the meantime the botanists of the party had proceeded down the river on this side as far as Logie House, and had secured a number of interesting plants. The whole party met once more at the Bridge, preparatory to starting on the homeward drive, but, before setting out, some photographs were taken of the picturesque and interesting old Bridge, with its high single span and its crumbling, moss-covered masonry. In driving home a halt was made at Lawmuir, where Mrs. G. A. Miller very kindly entertained the members to tea, which was very welcome after the day's hammering and digging.

It only remains to add that an unofficial geological excursion was held by some of the members at the close of the season, for the purpose of once more examining the fossiliferous beds in Balruddery Den, more especially for plant remains. The strata explored did not prove so productive as those examined on former occasions, but about a dozen specimens of *Parka decipiens* were secured and taken home for future examination with the microscope.

13th December, 1900.

HENRY COATES, F.R.S.E., President, in the Chair.

The following papers were read :—

1. "The History and Culture of the Grape Vine." By John Leslie, Pitcullen. (See *Trans.*, Vol III., Part III., page 101.)

2. "On Some Problems of the Fresh-Water Fauna." By W. T. Calman, D.Sc., University College, Dundee. Illustrated by a series of lantern slides.

10th January, 1901.

HENRY COATES, F.R.S.E., President, in the Chair.

The following papers were read :—

1. "Gulls, the Links of Land and Sea." By Lieut.-Col. W. H. M. Duthie, R.A., Doune. (See *Trans.*, Vol. III., Part III., page 105.)

2. "The Common Cuckoo." By J. B. Dobbie, M.B.O.U., Edinburgh.

14th February, 1901.

HENRY COATES, F.R.S.E., President, in the Chair.

The President proposed the following Resolution, which was seconded by Mr. Robert Brown, R.N., and unanimously agreed to:—

"That the Perthshire Society of Natural Science desires to record in its Minutes its sense of the irreparable loss which the Country has

sustained in the death of Queen Victoria, under whose peaceful and beneficent reign the Cause of Science, in common with every other department of the intellectual life of the people, has made such marvellous progress."

The following papers were read :—

1. "Birds of the Riverside." By William Whyte. (See *Trans.*, Vol. III., Part III., page 110.)

2. "Scottish Birds, their Haunts and Habits." By the Rev. H. A. Macpherson, M.A., M.B.O.U., Pitlochry. Illustrated by a series of lantern slides.

14th March, 1901.

THIRTY-FOURTH ANNUAL MEETING.

HENRY COATES, F.R.S.E., President, in the Chair.

The following Reports were read and adopted :—

REPORT OF COUNCIL.

In presenting their Thirty-Fourth Annual Report, the Council are pleased to be able to submit one of a favourable character.

During the past year 6 Monthly Meetings have been held, at which 8 papers were read, in addition to the 2 usual Addresses which it is the custom of the President to deliver.

The attendance at the Meetings has been very satisfactory and very regular, the average being 43. The greatest number at one Meeting was 51 on 12th April, 1900, and the lowest attendance 33 on 13th December, 1900.

Twenty-eight Ordinary Members have been added to the Roll, making a total Membership of 412, including 1 Honorary Member, 11 Corresponding Members, 5 Associates, 13 Associate Members, and 382 Ordinary Members.

During the summer 7 Excursions were held, which were fairly well attended. On the 16th April the Society joined with the class conducted by Mr. Corr, of Dundee, on Historical Geology and Palæontology, in a Geological Excursion to St. Andrews, Mr. Corr being leader, and a very pleasant day was spent. On the afternoon of the 28th April the Society had the pleasure of a visit from a large number of the Members of the Scottish Natural History Society of Edinburgh, who came to see our Museum, with which they expressed themselves as being greatly pleased. After examining the collections, the rest of their time was taken up with an Excursion to the top of Kinnoull Hill along with Members of our Society.

The Council desire to thank all who in any way contributed towards making the Summer Excursions pleasant and profitable, and especially do they thank the various proprietors who gave the permission necessary for some of the Excursions.

The Children's Essay Competition for the prizes offered by the President has again been very successful, 81 Essays having been sent in as compared with 70 for the previous year. The competitors, who came from many parts of Perthshire, as well as from the city, showed great interest in the subject, which was "The Legs, Feet, and Bills of Birds," and paid frequent visits to the Museum to study the Bird Collections. The competition is to be continued during the present season, the subject fixed on being "The Trees of Perthshire."

The Council again have to regret the loss of some very active and valued Members. Col. Campbell, who has always been an enthusiastic member, and who has done good work for the Society, has had to leave Perth; and though he retains his membership, we shall all miss his genial presence at our meetings. We are also about to lose Mr. T. M. M'Gregor, a very old and valued member, who is leaving for the Antipodes; but your Council intend still to keep his name connected with the Society by appointing him a Corresponding Member. Death, too, has robbed us of a young and very able member in the person of Mr. Robert Smith, B.Sc. Though Mr. Smith was a member for 5 years, yet, owing to his residence in Dundee, we had not seen much of him except when he came to give a paper. Recently, however, circumstances had brought him more amongst us; and just when we had come to appreciate his worth, and esteem him for his gentle and kindly nature, he was suddenly taken away. We all deplore his loss.

The use of the Lecture Room has again been granted to various local Societies.

The number of Visitors to the Museum during the year has been over 19,000.

REPORT OF TREASURER.

(See Balance-Sheet, page ci.)

REPORT OF TREASURER OF MUSEUM FUND.

(See Balance-Sheet, page cii.)

REPORT OF CURATOR.

Perthshire Museum.—Several additions of importance have been made to the exhibition cases in this department since my last report.

The Green Cormorant or Shag, *Phalacrocorax graculus*, Lin., presented to us, is a handsome male bird. It is the first representative of this species we have received, and is therefore a valuable addition to the local collection. A number of perching birds were presented to us, and these, after they were returned from the taxidermists, I mounted on natural twigs and stands. The result, I think, warrants the continuance of this method.

Another rare bird, the Green-backed Gallinule, *Porphyrio smaragdonotus*, Lin., has also been recently presented to the Society. It was taken on the Tay, near Errol, on October 10, 1880, the capture being recorded at the time in the *Perthshire Constitutional.* The

donor believes that this bird found its way to this country in a wild state, and that it is not, as might be supposed, an escape from some artificial pond.

Two specimens of Grouse, *Lagopus scoticus*, Lath., male and female, in the position of flight, have been placed in the Deer Case. Both birds are suspended by fine wires, and produce a pleasing effect, appearing to rise from the "mimic moor." The Society is indebted to Mr. Charles Kirk for the suggestion and gift.

A number of the fresh-water fishes preserved in spirits have been replaced by fresh examples, which have been mounted in formalin. The good condition of the fishes mounted in a five per cent. solution of formalin in 1895 shows the excellence of this preparation as compared with spirit for preserving fish.

To the Mammal Case has at last been added a specimen of the very rare Polecat, *Mustela putorius*, Lin. This specimen was killed in Rannoch about thirty-three years ago, and is in excellent condition. The last record of the Polecat in Perthshire, so far as I can find, was in 1880, when two specimens were killed at Edinchip. A number of valuable additions were made to the Lepidoptera and Diptera collections during the past year.

The geological reference and duplicate material has now been arranged and stored in the cabinets below the geological exhibition cases in the gallery.

Index Museum.—The systematic Bird Collection in the north wall case of this Museum is now complete, with the exception of a few rare birds. The classification adopted is that given by Evans in the *Cambridge Natural History*. The object of the collection is to exhibit an example of each family of both recent and extinct birds. Under each family is a card with a small map of the world, on Mercator's projection, on which is indicated, by a wash of red colour, the distribution in space of the living members of the group, while the distribution in time of the extinct forms is indicated in blue.

A number of the larger birds, for which there would not be space in the cases, are represented by Gambier Bolton's excellent photographs, which give a good idea of the characteristic attitudes of the birds. Reduced illustrations from Prof. Marsh's "Monograph on the Extinct American Birds" have been introduced to represent the extinct forms, while a cast has been purchased of the famous *Archæopterix lithographica*, a fossil bird with reptilian affinities, the original of which is in the Berlin Museum. These, with the Moa, represent the more important extinct forms. The case is strong in South American and Indian species. A series of Humming Birds from Ecuador illustrates the wonderful variety in size, colour, form of bill, tail, etc., as well as difference in sex, to be found in this interesting group.

Two cabinets have been placed in the spaces under the Nest Cases in the Perthshire Museum. Externally these are finished so as to appear as part of the case, while internally they are fitted with sliding trays of varying depths, which are interchangeable. In course of time the whole of the available space below the Nest cases will be utilised in this way, the cabinets being used for the accommodation

of the Reference Bird Collections. The collection of birds which we received from Ecuador more than fills the accommodation already provided.

The arrangement of the Fish Case is now almost complete, although we still lack some of the rarer forms, as well as several anatomical preparations, which, however, I hope to secure soon. The series embraced in this case comprises those intermediate forms which were formerly included in the Invertebrata, but which are now recognised to have vertebrate affinities, and also certain true vertebrate forms of the simplest type, in addition to the fishes proper, the latter ranging from the lower or cartilaginous forms to the higher or bony fishes. A few of the more important fossil forms are represented, drawings of restorations being placed beside the specimens to show the original character of the fish.

The cabinets under Table Cases A and B have been fitted with interchangeable trays of various depths, similar to those already described. In these are arranged the Reference Invertebrate Collections.

The Museum is indebted to the President for the most valuable and timely gift of the whole of his Shell Collections. These comprise an almost complete series of the British Marine and British Land and Fresh-water species; together with an extensive series of foreign shells, the whole representing the labour of many years. Indeed, the President has told me that he began the study of shells as a boy. The gift is subject to only one restriction, namely, that the British species are to be kept by themselves, as a distinct collection, but we are at liberty to make any additions to the collection that may be in our power, so as to complete the series. Regarding the foreign shells, we have a free hand, and they have therefore been incorporated in our Index series, giving us a fairly typical collection. This has enabled me to proceed with the arrangement of the Exhibition Shell Case, in Table-case H, at the north end of the Museum. In this series we have endeavoured to exhibit the characteristic form of shell in each Family, but in those families where there is much variation of type two or more examples are given. They are arranged according to the classification given in the *Cambridge Natural History.*

The number of visitors to the Museum during the year ended 28th February, 1901, was 19,156. It is gratifying to see the increasing interest taken in the Museum by school children. This is partly due to the institution of the Annual Essay Competition, which has also served to remove the impression which once prevailed in certain quarters that the Museum had been founded solely, or mainly, for the benefit of the Members of our Society. It has now come to be recognised that the Museum exists for the benefit of the whole community.

REPORT OF LIBRARIAN.

During the year the Library has been taken advantage of by 52 eaders, and 189 volumes have been taken out.

The number of volumes added by presentation was 242. Of

these the most important were the series of British Museum Catalogues, numbering 126 volumes, amongst them being many that will be of great use to the Members as works of reference in special departments of Natural History. There were also presented by various donors 31 parts of *Transactions* and other publications. These works were duly acknowledged at time of presentation, but this opportunity is taken of again expressing our gratitude to the generous givers.

There have also been added to the Library by purchase 48 volumes and 11 parts. In addition to the books taken out from the Lending Department, the Library is being increasingly used by Members wishing to consult the works of Reference. This is an important feature in the work of the Society, as most of these books are too costly to be purchased by private individuals.

REPORT OF EDITOR.

The Second Part of Vol. III., New Series, of the *Transactions and Proceedings* of the Society has been published and issued to Members during the year. Copies of the Society's *Transactions and Proceedings* have been sent to 21 Institutions (British and Foreign), and in exchange we have received many valuable additions to the Library.

The following Office-Bearers were elected :—

President—Henry Coates, F.R.S.E.
Vice-Presidents—Robert Brown, F.E., R.N., John Stewart, The Right Hon. the Earl of Mansfield, James Menzies.
Secretary—S. T. Ellison.
Treasurer—Alfred W. Brown.
Treasurer of Museum Fund—James Morison.
Librarian—James Coates.
Editor—William Barclay.
Councillors—Miss M. Thomas, L.L.A., Miss Macnab, L.L.A., R. D. Pullar, F.C.S., Robert Lawson.
Curator—Alex. M. Rodger.

The President delivered the following Address :—

Ladies and Gentlemen,—Before proceeding to the subject proper of my address this evening, I wish to take this opportunity of expressing what I know you all feel, namely, our deep regret at losing from the active membership of the Society our esteemed Vice-President, Colonel Campbell, who has lately been removed to an official position in Edinburgh. Col. Campbell joined the Society in 1884, on the nomination of the late Dr. Buchanan White, and ever since that time has been one of its warmest supporters in all departments of its work, whether as regards the Museum, the Winter Meetings, the Summer Excursions, or the Photographic Section. He has served on the Council for two periods of four years each, and was also for some time Secretary of the Photographic Section,

doing yeoman service in connection with the very successful Exhibition which was held two years ago. He has enriched our *Transactions* with several original contributions on the Ornithology of the district, and has also contributed many specimens to the Museum. What we shall miss most, however, is his cheery presence at our Excursions and Meetings, at both of which he was one of the most constant attenders. Indeed, an Excursion never seemed quite complete unless "The Colonel" were present, with his Frena camera, and his crook-handled stick! Our best wishes go with him, however, and we doubt not that he will still continue to take an interest in the fortunes of the P.S.N.S.

Since writing the foregoing sentences, I have learned with much regret that we are about to lose another of our most active and enthusiastic members, namely, Mr. T. M. M'Gregor, F.E.S., who is shortly to sail for New Zealand. Mr. M'Gregor joined the Society as early as 1875, showing that from boyhood he has been an enthusiastic naturalist. He has served both as a Councillor and as Vice-President. It is unnecessary for me to recall all that Mr. M'Gregor has done to encourage the study of his favourite science, Entomology, both by original research, and by leading others to take an interest in the subject. In particular, he has done much to encourage a love of Natural History amongst the young, especially in regard to the wonders of insect life. His original work has been of no mean order, and he has added much to our knowledge of the entomology of Perthshire, especially in regard to some of the less familiar orders of insects, such as the Hemiptera and Hymenoptera. Indeed, in these he has come to be recognised as one of the leading authorities in the country. Our thoughts will be with him in his distant home, where he has promised to continue his studies, and to send us, from time to time, some of the results of his researches, both in the form of specimens and communications. In virtue of this promise, the Council have had great pleasure in recommending that his name be added to the roll of our Corresponding Members.

CHILDREN'S ESSAY COMPETITION.

The Children's Essay Competition still continues to increase in popularity with the young people attending the schools both in the City and the County. This year the subject was "The Feet, Legs, and Bills of Birds," and 81 Essays were sent in, as compared with 70 last year, the ages of the writers ranging from 10 to 15. The success of the movement has again been largely due to the labours of our Curator, Mr. Rodger, in directing the children's studies. The object of these competitions is, in the first instance, to interest school children in our Museum, but a secondary and much more important object is, by means of the Museum, to interest them in Nature herself. That this latter object is being fulfilled, at least to a certain extent, I think will be best proved by quoting brief passages from one or two of the Essays. One competitor, a boy of 13, living in Birnam, writes as follows:—"I have often seen the Woodpecker among the trees searching for its food. It goes round

about the tree, always ascending and getting the insects out of the bark. As it climbs up the tree it taps upon the bark to see if the wood under it is decayed. If it finds such a place, it tears off the bark and takes all the insects out of the decayed matter."

A girl aged 15, living at a farm near Dunkeld, gives her experience as follows:—"Among wading birds, the Heron may be taken as an example. . . . It feeds mostly on fish, frogs, and water rats. It has, however, been known to eat young water hens, and its liking for eels has often caused it to lose its life. It has now become rare, and is not often seen near the habitations of man. I have, however, seen it in a small stream quite near to my home. It came for several days, but I have never seen it standing for any length of time, as I disturbed it through being too impatient to get near it."

A boy of 14, writing from Aberfeldy, opens his essay with some general remarks on the Study of Bird Life, in which the following passage occurs:—"To us in this country, birds offer the greatest scope for observation, because their varieties are greater than those of any other animal, and besides there is a peculiar interest attaching to them, as inhabitants of the air;—their lightness, their grace, their song, the strength of some, the weakness of others, the cunning, the quickness of movement,—these and other qualities make them worth watching." Proceeding to describe the habits of the Blackbird, as illustrated by its feet and bill, he says:—"Just now, as I am writing, a Blackbird is busy on the grass in front of the window. The snow, which has been lying there for a week, has disappeared during the night, and now "blackie" is not exactly making hay while the sun shines but picking up as much food as possible while the snow is away."

Another competitor living still further from Perth, namely, a boy of 13 at Killin, gives the following amusing account of his experiences in search of knowledge:—"Insessores or Perching Birds. I shall take as examples of this class the common Sparrow, Robin, and Blackbird, all of which I see in front of me, brought to a particular spot by some food which I have placed there, so that I might be better able to give my information at first hand. How provoking! some one in passing has disturbed them, and they have flown away to a tree. Well, now that I think of it, such an interruption to my nicely laid scheme is to my advantage after all, for I see by that that these birds are meant for a tree life. Here they are again, and now they are on the ground I see that they cannot walk, but move about with a series of little short hops. Now I have caught a Sparrow, and I see that it has three long, pointed, slender toes pointing forwards, and a short one pointing backwards. By this I see more clearly why it cannot walk and that these long slender toes are meant for grasping a branch or twig." He then goes on to describe the mechanism by means of which the bird automatically takes a firm grasp of the branch when it crouches down, so that it cannot fall off even when asleep.

The last passage I shall quote is from the essay by the Winner of the Bronze Medal, namely, James Hutton, Birnam, aged 13. He also chooses the Blackbird for special observation, and takes note of its habits as follows:—"I saw a Blackbird along the Dunkeld Road

not long ago, and I made the best of my opportunity to watch it procuring its food. It went to a muddy pool of water and put its bill into it. In a moment it came up again with a worm in it. The bill is pointed, to enable the Blackbird to dig, but there is also a reason why the bill is long. When a Blackbird digs with its bill, sand and stones are thrown into the air. If the bill were a short one, the sand and stones would go into its eyes. The long bill of the Blackbird then enables it to dig without fear of hurting its eyes."

Nearly all the essays are illustrated by sketches of the bills and feet of different birds, done either in pencil, ink, or coloured chalk, some of which show a considerable amount of artistic talent, as well as careful observation. I think we may fairly claim, therefore, that the competition has done something to train both hand and eye, as well as to stimulate a love for the things of Nature. The subject of Essay for next season will be "The Trees of Perthshire," and the conditions will be the same as formerly.

I cannot leave the subject of the Essay Competition without expressing my indebtedness to one who, alas! has been taken from us by death within the last few days, namely, the late Mr. William Whyte, H.M. Inspector of Schools for Perthshire. Mr. Whyte frequently expressed his warm approval of the movement, and did much to encourage it by commending the competition to teachers, especially in the country districts of the County.

The following is the Prize-List for the past season :—

FIRST DIVISION, Age 14-15 (9 Essays).

1st Prize—Margaret Duncan, Caledonian Road School, Perth.
2nd ,, —Jessie Menzies, Royal Grammar School, Dunkeld.
3rd ,, —Alexander Barrie Grieve, Public School, Aberfeldy.
Cert. of Merit—Agnes C. M. Macgregor, Royal Grammar School, Dunkeld.
,, —William Sanderson, ,, ,,
,, —Edith A. Macgregor, ,, ,,

SECOND DIVISION, Age 13 (24 Essays).

1st Prize and Bronze Medal—James Hutton, Royal Grammar School, Dunkeld.
2nd ,, —George Stewart, ,, ,,
3rd ,, —Robert Todd, Caledonian Road School, Perth.
4th ,, —James Smith, ,, ,,
Cert. of Merit—Ormond Steven, Public School, Killin.
,, —Margaret Gow, Torwood Public School, Birnam.

THIRD DIVISION, Age 12 (31 Essays).

1st Prize—Christina R. Stewart, Caledonian Road School, Perth.
2nd ,, —Mabel Duncan, ,, ,,
3rd ,, —Robert F. Robertson, ,, ,,
4th ,, —Vinnie Esplin, Western District School, Perth.
5th ,, —Archie Henderson, ,, ,,
Cert. of Merit—Robert Sanderson, Royal Grammar School, Dunkeld.
,, —Francis Hutchison, Western District School, Perth.
,, —George Bannerman, ,, ,,
,, —Maggie D. Forbes, Torwood Public School, Birnam.

FOURTH DIVISION, Age 11 and under (17 Essays).

1st Prize—Charles Keay, Western District School, Perth.
2nd ,, —Maggie Thomson, ,, ,,
Cert. of Merit—James Hill, ,, ,,
,, —James Anderson, ,, ,,
,, —Maggie B. Stewart, Caledonian Road School, Perth.

I now proceed to the subject which I have chosen for my Address this evening, namely,—

THE PROGRESS OF GEOLOGY DURING THE NINETEENTH CENTURY.

Since our last Annual Meeting we have passed two great dividing lines of History. Within a few weeks, the Nineteenth Century and the Victorian Era silently became closed chapters in the World's Record, and, almost unconsciously, we were launched on a new epoch. Already a brief reference has been made in our Minutes to the loss which Science, in common with all departments of modern thought, has sustained in the death of Queen Victoria. To-night I wish to glance backwards for a few minutes over the record of the past Century,—and particularly that part of it covered by the Queen's Reign,—in regard to one particular branch of Science, namely, Geology.

In looking back on the Queen's reign, I think it will become increasingly evident that it forms a sharply-defined period in nearly all departments of human thought. In many senses, the word "complete" seems written large on the record of the Queen's life. By a few weeks she had outlived the century, by a few days she had outlived the oldest of her predecessors on the Throne. Her reign was the longest on record, besides being unique in its blamelessness. But apart from these personal senses in which she had fulfilled her life's work, she also witnessed the completion of a distinct period in literature, in art, and in science. Of all the great names which made the period of her reign famous for all time in poetry, in music, in painting, in philosophy, only one or two of the first magnitude have survived her. The future historian, therefore, will be able to define the boundaries of the Victorian Era as sharply as those of the Elizabethan.

The chief characteristic of the reign has been the progress which has been made in all the arts of peace. For this we are largely indebted to the personality of the Queen herself, whose influence has always been cast on the side of peace, although, alas! her last days were saddened by an inglorious war. The progress of science and of the fine arts during the last sixty years also owe a good deal to the impetus which was given to them by the late Prince Consort, who was keenly alive to the importance of encouraging both original research and science and art teaching.

At the present moment, we seem to have reached a transition stage, and it is impossible to forecast in what particular direction development is likely to proceed next. In physical science, experiment has gradually been confirming the views put forth regarding the nature and properties of matter; in biological science, the theory of evolution has brought a mass of observed facts into orderly array; in applied science, the forces of nature have one by one been subjugated to the uses of man. In what domain of human knowledge will the next forward movement take place? For the answer to this question we shall probably have to wait until a new generation of workers comes forward, but we must bear in mind that whatever they may

accomplish in the way of discovery or generalisation, the ground has been prepared for them by those who have gone before,—both by those whose names are written in the roll of fame, and also by those more obscure workers who have accumulated the necessary store of facts, but whose names have been forgotten.

Passing from these more general considerations, let us glance very briefly at the development which has taken place during the nineteenth century and the Queen's reign in the science which I have chosen for consideration to-night, namely, Geology, or, in other words, in regard to our knowledge of the structure and history of the Earth's crust. Perhaps the best way to realise the progress which geology has made during the century which has just closed will be to try to picture to ourselves the stage which the science had reached at the beginning of that period. To enable us to do this intelligently, however, it will be necessary first to make a very rapid survey of the earlier stages of its development.

Geology, as we understand it at the present day, although generally regarded as one of the most recent of the sciences, was foreshadowed by the Greek philosopher Pythagoras, so long ago as five hundred years before Christ. In the writings of both himself and his pupils we find reference to marine shells being buried in rocks far from the sea, to the action of streams in carving out valleys, the work of the sea in eroding the coast, the phenomena of earthquakes and volcanoes, etc. This, truly, was a long step towards a correct view of the history of the Earth's crust; but after the time of these early philosophers a dark pall falls on the picture, which hardly begins to be drawn aside until two thousand years have elapsed. During these long ages, men's minds were more taken up with the rise and fall of empires, the wars between tribes and nations, and the controversies of the Church, than they were with abstract questions regarding the history of the globe on which they lived. Such at least was the condition of matters in Europe, but in Arabia, during the tenth century, the philosopher Avicenna was busy investigating the properties of minerals. When we come down to the sixteenth century, we find in Switzerland, where perhaps the struggle for existence was less severe than in other parts of Europe, a patient investigator, Gesner, working out the different forms of crystals that he found in various minerals, and also drawing figures of fossils. The next century finds Palissy in France, Steno in Denmark, Scilla in Italy, and Dr. Woodward in England, all groping after the true meaning of the fossil remains which they find buried in the rocks. The beginning of the eighteenth century finds the same investigations carried a little further by Moro and Vallisnero in Italy. The latter half of the eighteenth century brings us to the time of Abraham Werner, of Silesia, in Austria, who devoted his whole time to the enthusiastic study of rocks and minerals. Although he made many mistakes, and laid down false theories, which it took a generation to eradicate, yet he did invaluable service to science in calling men's attention to subjects which before had attracted but little notice, and out of the very strife which he originated the truth was evolved. The most valuable result of his work was the elucidation of the true

significance of stratification in rocks. The controversies which arose over the Wernerian theories gave rise to the two rival schools known respectively as the Neptunists and the Vulcanists, the former giving nearly all the credit for the origin of rocks to the agency of water, and the latter to that of fire. The first observer to discern the true position of each of these agencies in the economy of nature was a Scotchman, Dr. James Hutton, who, in 1788, published a treatise in the Edinburgh Philosophical *Transactions* entitled "A Theory of the Earth," which was afterwards enlarged and issued as a separate work in 1795.

During this time another observer, William Smith, was quietly and laboriously accumulating facts regarding the rocks of England and their relation to each other, and, in 1799, he published the first tabular record of the various formations in their correct order of sequence.

We have thus reached the very close of the eighteenth century, and we see that the ground has been gradually prepared for the workers who were to follow. The true history of the rocks had been foreshadowed by Pythagoras, it had been suggested afresh by Werner and Hutton, and now it remained for the geologists of the nineteenth century to build up on that foundation an elaborate superstructure of carefully-ascertained facts, and of generalisation deduced from these facts.

We are now in a position to understand the stage which the science of geology had reached at the beginning of the year 1801, One Hundred years ago.

At that date, James Hutton had been dead for three years, but his friend and biographer, Professor John Playfair, still survived, and was busy compiling his "Illustrations of the Huttonian Theory," which was published two years later, and attracted much more attention than the original work had done. A young Scotch student, Robert Jameson, then 26 years of age, had recently returned from Freiberg, in Saxony, where he had been studying geology under Werner, and four years later he was appointed to the Chair of Natural History in Edinburgh. Sir James Hall, who had assisted Hutton by his experiments on igneous rocks, was still in the prime of life, being then 39 years of age. In England, William Smith, who was 31 years of age, was hard at work compiling the first Geological Map of England, which was published fifteen years later. As yet there were no Geological Surveys at work, and no Geological Societies had been founded, but seven years later the Geological Society of London was inaugurated. In Paris, Baron Cuvier, the great naturalist, was examining and comparing the fossil animals which he found in the rocks of the Paris Basin, and restoring their original forms.

This exhausts the list of the more eminent geologists who were actively at work at the commencement of the century. Several others who were to leave their names on the new century's roll of fame were yet in infancy or early youth. Charles W. Peach was one year old; Charles Lyell and John Anderson, father of the late Minister of Kinnoull, were both three; Roderick Murchison was eight; Adam Sedgwick, thirteen; William Buckland, sixteen; and

Charles M'Laren and James Smith, who were afterwards to investigate respectively the geology of the East and of the West of Scotland, were both eighteen.

We thus see that when the nineteenth century dawned geology had reached a period of transition. In one sense, as a modern science of precise observation and deduction, it may be said hardly to have passed its initial stage; while, in another sense, it was as old as philosophy itself. True, James Hutton had a few years previously recorded his conviction that it is to the forces at work on the earth at the present day that we have to look for the key to the problems of the past, but it yet remained for his expositor, Playfair, to put these ideas in such a form as to attract serious attention to them. Then again, Werner had already advanced his belief that the stratified rocks had been laid down under water, during the course of long ages, but the influence of the popular interpretation of the Mosaic Cosmology, limiting the age of the earth to some five or six thousand years, still militated against the acceptance of this view. In like manner, the views advanced by Cuvier and others regarding the true origin of fossils were still looked on by many as antagonistic to the orthodox doctrine of the Noachian Deluge, which was supposed to account for the presence of animal and plant remains in the sedimentary rocks, unless, indeed, these were mere "Freaks of Nature." These prejudices were not fully overcome until thirty years later, when Lyell brought forward an overwhelming mass of evidence, gleaned from all parts of the world, to prove that the crust of our earth has been built up, not by a series of catastrophes, but by a majestic process of gradual development, the result of the familiar forces of nature, acting through the long ages of the past.

The period of thirty-seven years, extending from the beginning of the century to the beginning of the Queen's reign, was one of great activity and advance in Geology. Foremost among the workers in England were William Smith, the pioneer of geological surveyors, who died two years after the Queen ascended the Throne; Prof. William Buckland, who helped to make the science popular by means of his lectures; Prof. Adam Sedgwick, eminent both as a teacher, and as the interpreter of the Cambrian System in Wales; Sir Roderick Murchison, who unravelled the next great system in the geological sequence, namely, the Silurian; Sir Charles Lyell, gradually accumulating materials for his monumental "Principles of Geology," published in 1830–33; Sir Henry De la Beche, Prof. John Phillips, and others of less note. In Scotland, Prof. Robert Jameson still occupied his Chair in Edinburgh; John MacCulloch, who died in 1835, had completed his researches among the rocks of the Highlands; Hugh Miller was already at work amongst the Old Red Sandstone rocks of the North, although his book was not published until four years later; and William Nichol, of Edinburgh, had perfected his method of examining transparent sections of rock under the microscope. Charles M'Laren's "Geology of Fife and the Lothians" was published one year after the Queen came to the Throne, but already one or two rough geological maps of Scotland had been published.

During this period, another great name was beginning to come into

prominence, namely, that of Charles Darwin, who holds an honourable place among the geologists of the century, although his geological work is apt to be overshadowed by his stupendous labours in the domain of biological science. During the five years preceding the Queen's Accession, Darwin was engaged with researches in many parts of the world, as Naturalist on board H.M.S. "Beagle," and the results of his geological observations were afterwards published in the volumes entitled "The Structure and Distribution of Coral Reefs," "Geological Observations on Volcanic Islands," and "Geological Observations in South America."

Now, at the close of the Queen's reign, all of these workers have passed away, and a new generation of geologists has arisen. Their work, however, lies more in the direction of specialisation and elaboration. The broad lines of the science have been securely laid down, and its different branches firmly established. Government Geological Surveys are entirely the growth of the last sixty years. During that period the greater portion of the British Isles, and of the various countries of Europe, as well as large areas of the United States, Canada,* India, and Australia have been carefully surveyed, and their geological features accurately mapped. The English Survey was for long associated with the name of one of the most eminent geologists of the reign, namely, the late Sir Andrew C. Ramsay. The fossil contents of all the sedimentary formations have now been pretty exhaustively explored, tens of thousands of species having been figured and described. The department of Petrology may be said to have come into existence during the last century, as very little was known regarding the precise structure and composition of the different rocks before then. Mineralogy, also, athough a much older department of geology, has made great strides, owing largely to improved methods and appliances of research. Our knowledge of Glacial Geology, or the former great extension of the Arctic Ice Sheet, has been entirely obtained within the last sixty years, the first observations having been made in Switzerland by Louis Agassiz in 1840. The great antiquity of man, as an inhabitant of the globe, has gradually come to be recognised during the course of the century, though in the face of much prejudice. In 1825, the first flint implements of human workmanship, associated with the bones of extinct animals, were discovered by M'Enery, at Kent's Cavern, in the south of England. Following on this came the great discovery of flint implements at Abbeville, in France, by M. Boucher de Perthes; and, in 1863, Lyell summed up the argument in his "Antiquity of Man."

The economic effects of our increased knowledge of the structure of the earth's crust have been very marked. Agricultural science now adapts itself to the varying conditions of soil and sub-soil, according to the nature of the rock prevalent in each district. Now that we know the precise sequence of the geological formations, mining, whether for coal, iron, or the precious metals, has lost much of its haphazard character, with the result of an enormous increase of the

*Within the last few days, the brilliant Chief of the Geological Survey of Canada, Dr. George Dawson, has passed away. His father, the late Sir J. W. Dawson, was also one of the most noteworthy geologists of the period.

wealth of the world, as well as greater safety to the life of the miner. The problems of water supply have been greatly simplified, as we now know what kind of strata are likely to contain water, and where these should occur in any given series of rocks.

Apart from these utilitarian considerations, however, it is impossible to estimate how greatly our intellectual life has been enriched by our increased knowledge of the wonderful story of the past history of our globe. A generation ago, it seemed to many that the progress of geological science was striking at the very roots of the Christian faith; but, far from such being the case, I believe it has done more than almost anything else to widen our views of the wisdom and power of the Creator.

11th April, 1901.

HENRY COATES, F.R.S.E., President, in the Chair.

The following communication from A. S. Reid, M.A., F.G.S., Trinity College, Glenalmond, was read :—

NOTE ON SOME CRUSTACEAN TRACKS FROM THE CAIRNIES QUARRY, GLENALMOND.

The above quarry is situated on the right (south) bank of the Almond, two-thirds of a mile due west from Trinity College. The quarry is that from which the building stone for the College was obtained in 1843, etc., and was recently opened again (1891) to provide stone for further building operations. The rock is the usual rose-grey micaceous sandstone of the district, with argillaceous partings, "clay-galls," and slightly calcareous concretions, and affords excellent examples of ripple-mark and sun-cracks, with occasional remains of *Psilophyton*. Last month (March, 1901) a slab of sandstone was brought to me from this locality, which, besides having casts of a net-work of sun-cracks, has at one end of it the casts of a set of crustacean tracks. These occur in two parallel sinuous lines, extending for a length of $7\frac{1}{2}$ inches across one corner of the slab; the marks are regular and continuous, and when the lines curve they keep their parallelism. As the surface of the slab is less argillaceous than the surface of the specimen from Balruddery lent me by Mr. Henry Coates for comparison, the markings are not quite so distinct as in that specimen; but the distance between the two lines of tracks in each specimen is practically the same, namely, ·31 inch, and the average distance between the adjacent marks in the separate lines is again the same, namely, ·17 inch, in each specimen.

The Balruddery specimen was, I understand, associated with undoubted crustacean remains (*Pterygotus anglicus*), so that the occurrence of crustacean tracks in the sandstone of the Cairnies Quarry leads one to hope that these rocks, hitherto considered barren of all organic remains save that of *Psilophyton*, may yet yield some further organisms.

The following papers were read:—

1. "A Preliminary List of the Collembola and Thysanura of Perthshire." By William Evans, F.R.S.E., M.B.O.U., Edinburgh. (See *Trans.*, Vol. III., Part III., page 150.)

2. "On the Occurrence of a Zone of Annelid Burrows across the Southern Highlands of Scotland." By Peter Macnair, Glasgow. (See *Trans.*, Vol. III., Part III., page 131.)

3. "Six Months in Ecuador, with Notes on the Natural History." By A. E. Payne, Kew. (See *Trans.*, Vol. III., Part III., page 116.)

PHOTOGRAPHIC SECTION.

1900.

November 22nd.—First Monthly Meeting of Winter Session. This took the form of a Social Meeting and Exhibition of Members' Work. Tea was provided by the Lady Members. A large quantity of excellent work was shown, and it was decided to hold a public exhibition, confined to Members only, this year, with the view of having an open one next year.

December 27th.—Monthly Meeting held, when a goodly number of Members' Lantern Slides were shown.

1901.

January 24th.—Monthly Meeting put off on account of the Death of the Queen.

February 28th.—Monthly Meeting held. Mr. Elison read a paper on Orthochromatic Photography, accompanied with a large number of Lantern Slides and Spectrum Experiments. This was followed by a Lantern Lecture, by Mr. Jas. Coates, "Venice Illustrated." Both gentlemen were listened to with great interest by a large turnout of Members.

March 4th.—A very successful Exhibition of Members' Work was opened in Sandeman Art Gallery on this date; 32 members contributed 110 pictures. The Exhibition, which closed on March 16th, was visited by a large number of the general public.

March 28th.—Monthly Meeting held. On this occasion, besides the Demonstrations of Carbon, by Mr. A. Nicol, and Ozotype, by Mr. A. Mackenzie, we were favoured by hearing Sheriff Scott Moncrieff Penny deliver a lecture on "The Mountains of Skye," illustrated by a number of excellent lantern slides.

April 25.—Monthly Meeting held. Interesting papers were read by Mr. J. Sime, on Flashlight Photography, and by Mr. George Young, on Astronomical Photography, with illustrations.

LIST OF DONATIONS TO THE MUSEUM AND LIBRARY,

From 1st April, 1900, to 31st March, 1901.

I. PERTHSHIRE COLLECTION.

Water Scorpion, *Nepa cinerea*—Mr. P. D. Malloch.
Wood Wasp (male)—Mr. H. M. Whittell.
Rhagium inquisitor (pupa)—Mr. H. C. Johnston.
Dragonfly, *Aeshna juncea*—Mr. J. Malloch.
Coleoptera 3 species—Mr. Robert Lawson.
Lepidoptera, 8 species—Mr. Robert Lawson.
,, 25 species—Mr. William Wylie.
Hemiptera, 3 species—Mr. William Wylie.
Hymenoptera, 13 species—Mr. Wiliiam Wylie.
Pike—Mr. A. H. Lumsden.
Perch—Mr. A. H. Lumsden.
Grayling—Mr. A. H. Lumsden.
Lizard—Mr. J. S. Grant.
Green Shag (male)—Mr. P. D. Malloch.
Great-crested Grebe (young male)—Mr. G. F. Hart.
Green-finch—Miss Coates.
Green-backed Porphyria—Mr. J. G. Millais.
Golden-crested Wren (male)—Mr. T. W. Wilson.
Common Wren (male)—Mr. T. W. Wilson.
Green-finch (male)—Mr. T. W. Wilson.
Robin (male)—Mr. T. W. Wilson.
Blue Tit (male)—Mr. T. W. Wilson.
Long-tailed Tit (male)—Mr. T. W. Wilson.
Tree Creeper (female)—Mr. T. W. Wilson.
Grouse (male and female)—Mr. C. Kirk.
Long-eared Bat—Mr. C. Masterson.

II. INDEX MUSEUM.

Leather Urchin, *Phormosa placenta*—Prof. D'Arcy W. Thompson, C.B.
400 Land and Freshwater Shells from Ecuador—Mr. Archer Harman.
Cabinet containing a representative collection of British Marine, Freshwater, and Land Shells—Mr. H. Coates.
Cabinet containing a small collection of Foreign Marine, Freshwater, and Land Shells—Mr. H. Coates.
73 Species of Shells from New Hebrides—Mrs. Paterson.
12 Species Indian Butterflies, illustrating mimicry—Mrs. Atholl MacGregor.
98 Butterflies and Moths—Col. Irby.
16 British Moths—Mr. R. Lawson.
Small Collection of Beetles from Ecuador—Mr. Archer Harman.
A number of Beetles (Foreign)—Col. Irby.
Small collection of Beetles from Fiji Islands—Mr. A. King.

Sting of Honey-bee (model in plaster)—Mr. James Stewart, L.D.S.
Stick Insect—Prof. D'Arcy W. Thompson, C.B.
Spider Crab—Prof. D'Arcy W. Thompson, C.B.
Sea Spider, *Boreonymphon robustrum* with *Scalpillum nymphicola* attached—Prof. D'Arcy W. Thompson, C.B.
Coral-reef Fish, *Chaetodon falcula*—Prof. D'Arcy W. Thompson, C.B.
Snake, Cast Skin from S. Russia—Mr. James Rodger.
275 Humming Birds from Ecuador—Mr. Archer Harman.
575 Birds from Ecuador—Mr. Archer Harman.
2 Tinamus Eggs from Ecuador—Mr. Archer Harman.
Condor (male and female) from Ecuador—Mr. Archer Harman.
2 Humming Birds, in the flesh, from Ecuador—Mr. Archer Harman.
Cock-of-the-Rock—Miss Jameson.
4 Arctic Terns (young)—Mr. F. Hart.
Red-throated Diver, Arctic—Capt. Milne.
Black-throated Diver, Arctic—Capt. Milne.
Knot, Arctic—Capt. Milne.
Long-tailed Duck, Arctic—Capt. Adams.
Grey Phalorope, Arctic—Capt. Adams.
Greenland Falcon, Arctic—Capt. Adams.
Eggs of Little Auk, Ptarmigan, Sandpiper, Arctic—Capt. Adams.
Golden Pheasant—Col. Duthie.
Horned Pheasant—Col. Duthie.
2 Macaws—Mr. E. H. Bostock.
Musk Ox Skull, Arctic—Capt. Robertson.
Small Rodent, Ecuador—Mr. Archer Harman.
Highland Ram's Head—Mr. J. S. Grant.
Fern, *Hymenophyllum unilaterale*—Mr. Charles M'Intosh.
Calc-sinter and Copper, Palermo—Mrs. Ferrier.
Scoriaceous Lava, Vesuvius—Mrs. Ferrier.
Flint Arrow-head—Rev. Canon Farquhar.

III. LIBRARY.

Strathearn, in Perthshire, Picture of, 1832, John Brown.
Comrie Earthquakes, 1875, James Drummond.
Perth, Guide to the City, 1812.
,, ,, 1822.
Perthshire, Sketches of, Patrick Graham, D.D., 1810.
,, ,, ,, 1812.
Tay, Topography of the Basin of the, James Knox, 1831.
Perth, Ecclesiastical Annals of, R. Scott Fittis, 1885.
Perth; Its Annals and Archives, David Peacock, 1849.
Tay, The, a Poem, David Miller, 1850.
Muses Threnodie, The, H. Adamson, comp. by James Cant, 1774.
Perth, An Act for Making and Regulating the Highways, Bridges, and Ferries in the County of, 1811. The Report of R. Stevenson & Son—Perth Harbour, 1834. An Act for Enlarging and Improving the Port of Perth, 1834.

} Mr. H. Coates.

Natural History Society of Glasgow, Transactions of, Vol. V., Part 3—The Society.

Missouri Botanical Garden, Eleventh Annual Report, 1900—The Directors.
Klondyke Gold Fields, Preliminary Report on—Geographical Survey of Canada.
Sydney Coal Fields, Report on the—Geographical Survey of Canada.
Natural History Works (various), 60 volumes—Mr. G. L. Moffat, M.A.
Birds, Legislation for the Protection of—U.S. Department of Agriculture.
North American Fauna, Nos. 17, 18, and 19—U.S. Department of Agriculture.
Fishery Board of Scotland, Eighteenth Annual Report of, Parts II. and III. —Scottish Fishery Board.
Geological Society, Quarterly Journal of, 1898, 1899, 1900; Part I. for 1901 —The Geological Society.
Academy of Natural Science, Philadelphia, U.S.A., Proceedings of, Parts I. and II.—The Geological Society.
Geological Survey of the United States, Annual Reports, 1895-1899, in 19 volumes—Survey Department, U.S.A.
American Museum of Natural History, N.Y.C., Report for 1899—The Museum.
Department of Agriculture, U.S., Year Book of, 1899—The Department.
Australian Museum, Records of, Vol. II., No. 7; Vol. III. No. 7—The Museum.
British Museum Catalogues and Guides, 124 volumes—The Trustees.
Manchester Museum Report, 1899-1900, No. 31—The Director.
,, ,, Notes on some Jurassic Plants, No. 30—The Director.
Board of Agriculture Leaflets, Nos. 64 and 65—The Department.
Agriculture, Year-Book of the Department of, U.S.A., Bulletins Nos. 13 and 14 —The Department.
Monte Video, Anales del Museo Nacional, Tom. II., Fas. XV., XVI.—The Museum.
Glasgow Andersonian Naturalists' Society, Annals of, Vol. II., Part 2—The Society.
Riverside Natural History, 6 volumes—Mr. Rufus D. Pullar.
Botanical Society of Edinburgh, Transactions and Proceedings of, Vol. XXI., Part IV.—The Society.
Scottish Geographical Magazine, 1900—Mr. H. Coates.
Forest Trees and Woodlands, Our, John Nisbett, 1900—Mr. H. Coates.
Berwickshire Naturalists' Club, Proceedings of the, Vol. XVII., Part I.—The Society.
Bunkle and Preston, The Session Book of—The Society.
Scottish Natural History Society of Edinburgh, Transactions of, Vol. I., Part I. —The Society.
Buchan Field Club, Transactions of, Vol. V., Part 3—The Society.
Report on the Scientific Investigations, Northumberland Sea Fisheries Committee, 1900—Mr. A. Meek, M.Sc.
Botanical Survey of Scotland, Edinburgh District—Mr. R. Smith, B.Sc.
,, ,, Northern Perthshire—Dr. W. G. Smith.
Edinburgh Field Naturalists' and Microscopic Society, Transactions of, Vols. III. and IV., Parts 1 and 2—The Society.
Museums Association, Report of Proceedings, 1900—The Association.
American Museum of Natural History, Bulletin of, Vol. XI., Part 3; Vol. XII. —The Museum.
Conchology, Dr. J. C. Chenu—Mr. H. Coates.
Playfair, John, The Works of, 4 volumes—Mr. H. Coates.

ADDITIONS TO THE ROLL OF MEMBERSHIP

DURING WINTER SESSION 1900-1901.

ORDINARY MEMBERS.

Adams, C. L., Solicitor, 80 Darlington Street, Wolverhampton, 11th April, 1901
Bates, George F., B.A., Perth Academy, ... 8th November, 1900
Buhrer, Jean J., L.-ès-L., 3 Pitcullen Crescent, ... 8th November, 1900
Campbell, Archibald, Athole Place, ... 8th November, 1900
Campbell, Miss, Muirton Bank, ... 8th November, 1900
Constable, A. H. B., Advocate, Edinburgh, ... 11th April, 1901
Davie, Miss, Westfield, Glasgow Road, ... 13th December, 1900
Dow, Thomas, Jeanfield, ... 14th March, 1901
Fraser, John, South Methven Street, ... 8th November, 1900
Ferguson, Archibald M., Pitcullen Terrace, ... 8th November, 1900
Gray, J., Rockland Villa, Craigie, ... 8th November, 1900
Henderson, W., M.A., Schoolhouse, Bendochy, Coupar-Angus, 11th April, 1901
Hutcheson, Mrs., Beechwood, Glasgow Road, ... 11th April, 1901
Keay, John, 6 Spens Crescent, ... 8th November, 1900
King, Mrs., 2 Blackfriars Street, ... 11th April, 1901
Lyell, John, M.B., C.M., 15 Marshall Place, ... 8th November, 1900
Martin, David, York Place, ... 14th March, 1901
Matthews, George S., 2 Readdie's Buildings, ... 14th February, 1901
Murray, D. Scott, Perth Academy, ... 14th March, 1901
Macdonald, Miss Flora, Woodlands, ... 8th November, 1900
Macdonald, Miss Ida, Woodlands, ... 8th November, 1900
M'Farlane, Miss, 2 King's Place, ... 8th November, 1900
Newlands, Miss Helen, Tayside, ... 13th December, 1900
Peebles, George, High Street, ... 8th November, 1900
Raffan, Miss Eliza, L.L.A., Perth Academy, ... 8th November, 1900
Richardson, James, Blairgowrie, ... 14th March, 1901
Robertson, Miss Isabella, 2 Blackfriars Street, .. 11th April, 1901
Shepherd, Miss M., 3 Charlotte Place, ... 8th November, 1900
Sievwright, Sir James, K.C.M.G., Hertford Street, London, ... 8th November, 1900
Smith, Alexander, Corsiehill, ... 10th January, 1901
Stewart, C. Parker, M.B., C.M., B.Sc., 21 Marshall Place, 8th November, 1900
Stewart, John A., Solicitor, Tay Street, ... 8th November, 1900
Syme, Bruce, Muirton Bank, ... 13th December, 1900
Thomson, J. C. W., 6 North Methven Street, ... 8th November, 1900

SUMMER SESSION, 1901.

THE following Excursions were arranged :—

1. Thursday, 23rd May.—Loch Katrine.
   Conducted by Mr. H. Coates, F.R.S.E.
2. Saturday, 8th June.—Banks of Almond, from Dalcrue Bridge to Almondbank.
   Conducted by Mr. Menzies.
3. Saturday, 22nd June.—Muir of Thorn.
   Conducted by Mr. Lawson.
4. Saturday, 6th July.—Ben Laoigh. (Meeting of the Mountain Club at Two P.M.)
   Conducted by Mr. Meldrum.
5. Saturday, 27th July.—Sauchie, near Stirling, and the Howietoun Fish Hatcheries. (Jointly with Scottish Natural History Society of Edinburgh.)
6. Saturday, 10th August.—Banks of Isla, Coupar-Angus to Cargill.
   Conducted by Mr. Barclay.
7. Saturday, 12th October.—Kinnoull Hill (Cryptogamic Excursion).
   Conducted by Rev. Dr. Paul, of Edinburgh.

PHOTOGRAPHIC SECTION.—Additional Half-Day Excursions :—

1. Saturday, 1st June.—Quarrymill.
2. Saturday, 29th June.—Scone Palace.
3. Saturday, 3rd August.—Moncreiffe Pond and Grounds.
4. Saturday, 7th September.—River Bank, Perth to Kinfauns.

BALANCE-SHEET of THE PERTHSHIRE SOCIETY OF NATURAL SCIENCE for the Year ended 28th February, 1901.

INCOME.

To Balance in Savings Bank at 28th February, 1900,	£2	13	11
,, Annual Subscriptions and Entrance Fees, ...	96	2	0
,, Life Members, ...	5	5	0
,, Contributions towards Expense of Coal and Gas,	5	13	2
,, Interest on Bank Account for Year, ...	0	2	6
,, From Sale of *Transactions*, ...	0	6	0
	£110	2	7

EXPENDITURE.

By Geology Class Expenses, ...	£2	6	0
,, Proportion of Janitor's Salary, ...	5	0	0
,, Refunded to late Treasurer, ...	0	14	0
,, Fire Insurance, ...	7	0	0
,, Feu-Duty and Income Tax, ...	8	0	6
,, Repairs and Furnishing, ...	1	8	0
,, Fuel and Gas, including Arrears, ...	27	14	8
,, Printing Society's *Transactions*, Stationery, etc.,	34	18	9
,, Books, Magazines, and Binding, ...	12	18	9
,, Postages and Petty Expenses, ...	5	5	8½
,, Subscriptions to other Societies, ...	1	1	0
,, Balance in Savings Bank at 28th February, 1901,	2	16	8
,, ,, Treasurer's Hands ,, ,,	0	18	6½
	£110	2	7

PERTH, 7th March, 1901.—We have examined the foregoing Accounts for the year, with the relative vouchers, and find them correct. The sum in Savings Bank at the close of the year is £2 16s 8d, and in Treasurer's hands 18s 6½d; total, £3 15s 2½d.

(Signed) JAMES MORISON,
WILLIAM BARCLAY, } *Auditors.*

PERTHSHIRE SOCIETY OF NATURAL SCIENCE—MUSEUM FUND.

ABSTRACT OF ACCOUNTS, Year ending February, 1901.

INCOME.

Balance at Credit of the Fund, Feb., 1900,	£1	1	4
Subscriptions and Grants, ...	305	2	0
Collected per Box in Museum, &c., ...	3	6	1
Total, ...	£309	9	5

PRESENTED
8 NOV 1901

EXPENDITURE.

Salaries of Curator and Janitor,	£170	0	0		
Specimens and Mounting same,	56	14	7		
Boxes, Tablets, Trays, &c.,	54	12	6		
Furnishings, ...	18	2	0		
Petty Expenses, ...	9	13	6		
Year's Payments,				£309	2 7
Leaving Balance at Credit, Feb., 1901, ...				0	6 10
				£309	9 5

[This Part, pp. lxxiii to cii, published 1st November, 1901.]

WINTER SESSION, 1901-1902.

14th November, 1901.

HENRY COATES, F.R.S.E., President, in the Chair.

Mr. James Menzies exhibited a specimen of *Carex divisa*, Huds., gathered by him in a marsh near Montrose, and identified by Mr. Arthur Bennett, Croydon. This sedge was recorded by George Don more than 80 years ago, but had not been found subsequently until Mr. Menzies came upon it in August last. He said it was peculiarly gratifying that Don's accuracy in this, as well as in many others of his records on which doubts had been cast, had been vindicated against his detractors, and that justice was now being done to one of the most eminent botanists that Scotland has produced.

The President was appointed, as representative of the Society, to attend the Jubilee Celebration of the Natural History Society of Glasgow on 4th December next.

The President delivered the following Opening Address :—

LADIES AND GENTLEMEN,—I take it that the chief function of a President's Opening Address at the beginning of our winter session should be to afford an opportunity for recording in our *Proceedings* from year to year any natural phenomena affecting the Natural History of our district, and also any occurrences affecting the welfare of our society. Under the first of these categories come the following

SEASONAL NOTES.

As the summer of 1900 was characterised by its dulness, so the summer of 1901 has been distinguished by a remarkable continuance of sunshine. Although, as will be seen from the following comparative tables, the average temperature was not greatly higher, and the total rainfall was only about 25 per cent. less, yet the impression produced by the long-continued sunshine and the cloudless skies made the difference appear very much greater.

The effect produced on animal and plant life, and upon the health of the community, by these meteorological conditions has been very marked. Flowers have been very abundant and bright in colour, and remained in bloom until far on in the season. This was particularly noticeable in the case of the roses. Foliage was exceptionally heavy, and remained long on the trees, but the autumn tints were not so brilliant as they sometimes are. Apples and pears were plentiful and of good quality, and so also were small fruits, such as gooseberries and currants, but stone fruits, such as plums, were by no means a heavy crop. Insects of all kinds were more than usually abundant, and this was specially noticed in the case of bees and wasps. Probably

in consequence of the excess of insect life, birds were more than usually numerous, and seemed also to be more tame than usual. With regard to our forest trees, acorns and horse chestnuts were exceedingly numerous and well developed as regards size, but the beech trees, on the other hand, bore a very small crop of fruit.

The effect of the season on the health of the community may be seen at a glance from the following comparative table of the death-rate for Perth during the summer months of 1900 and of 1901 :—

	1900.	*1901.*
May,	23·3	16·8
June,	20·9	15·5
July,	14·1	18·2
August,	17·2	16·6
September,	20·9	13·7
October,	16·0	16·1

It will thus be seen that the mean death-rate for the six summer months of 1901 was 16·2 per 1000 of the population, as compared with 18·7, which was the mean death-rate for the six summer months of 1900. This shows pretty clearly, I think, the effect of the continuous sunshine on the vitality of the community.

The comparative figures of the temperature and rainfall for the summer months of 1900 and 1901, as recorded by the instruments at Pitcullen, are as follows :—

I. Mean Monthly Temperature.

	1900.	*1901.*
May,	49·4° F.	50·8° F.
June,	56·1° F.	54·1° F.
July,	60·5° F.	62·7° F.
August,	56·6° F.	59·2° F.
September,	52·8° F.	54·4° F.
October,	45·2° F.	45·1° F.

The mean temperature for the six summer months of 1901 was thus 54·4° F., as compared with 53·4° F. in 1900. The highest temperature registered was 82·5° F., on 4th July, 1901, as compared with 78° F., on 14th August, 1900.

II. Monthly Rainfall.

	1900.	*1901.*
May,	1·65 inches	0·65 inches
June,	2·61 ,,	4·10 ,,
July,	2·97 ,,	1·13 ,,
August,	3·98 ,,	4·20 ,,
September,	2·32 ,,	1·84 ,,
October,	3·75 ,,	1·80 ,,

The total rainfall for the six summer months of 1901 was thus 13·72 inches, as compared with 17·28 inches in 1900. There were

two consecutive weeks during which no rain fell, namely, those ending 18th and 25th May. The maximum weekly rainfall of the summer occurred in the week immediately succeeding these, namely, that ending 1st June, when a total of 2·23 inches was recorded. The greatest rainfall within twenty-four hours was 1·64 inches, on 10th August, as compared with 2·14 inches on 22nd August, 1900.

As no very excessive heat was experienced during the summer, so also there was almost a complete absence of thunder. The only thunder-storm of any note which visited Perth was on Saturday, 10th August. On that day peals were heard at frequent intervals for several hours, but the storm could not be said to be severe.

Wind storms have also been of rare occurrence, and no high velocities have been recorded. On many days throughout the summer, indeed, the leaves of the trees were scarcely stirred. If wind storms have been conspicuous by their absence, however, one rather rare wind phenomenon was witnessed at Pitcullen, namely, a distinctly marked whirlwind, which occurred about 3.30 p.m. on Tuesday, 18th June. The occurrence took place within the walled fruit garden, where a large strawberry bed, some 15 yards square, had been laid with straw and covered over with netting. Without a moment's warning, the whole of the straw, together with the netting, was lifted bodily into the air to a height of fully one hundred feet, circling with a spiral motion as it rose. It was then carried through the air for a distance of about 60 yards, and fell on one of the fields belonging to Murray's Asylum. When found, the whole mass of straw and net was twisted up in a spiral coil. This strange occurrence was witnessed by three of the gardeners. During the morning there was no wind, but at the time of the whirlwind a light breeze had sprung up from the north, the sky was free from clouds, and the sun was shining brightly. Mr. Leslie has suggested, as an explanation of this phenomenon, that the air contained within the walls of the garden had become heated by the sun's rays, and that, when the northerly breeze produced a cooler stratum of air above, the warmer column below was forced upwards, with the usual spiral motion.

The whirlwind, however, was by no means the only unusual phenomenon which we were privileged to experience during the past summer, for, at 1.25 a.m. on Wednesday, 18th September, we were visited by a very distinct shock of earthquake. The centre of the disturbance seems to have been in the neighbourhood of Inverness, but the time at which it was felt here seems to have been almost exactly the same as that recorded in the north. The shock was felt by a large number of persons in Perth and the neighbourhood, who described their experiences in varying terms. One thought at the time that it was produced by an exceptionally heavy train, another imagined that a traction engine was passing his house, while a third thought of burglars beneath his bed. In some cases the doors were heard to rattle, while in others a sound like the rushing of wind was heard. In every case the predominant sensation appears to have been a distinct up and down motion of the bed repeated three or four times in rapid succession.

The only other natural phenomenon to which I shall refer is one

which has a rather more direct bearing on biological science, and which illustrates the relation which meteorology has to the physiology of plants. By the middle of March last, a spell of mild weather set in, and, thinking that the winter was past, we had a number of trees pretty extensively pruned. Amongst others, a large sycamore tree had its lower limbs cut off. A few days after, the new sap began to rise in the stem, stimulated, no doubt, by the mild weather. At the end of March, however, the temperature suddenly fell, and on Friday, 29th March, the thermometer stood at 16° F., indicating 16 degrees of frost. The consequence of this was that the sap, which had begun to flow freely from the ends of the severed limbs, became frozen, and hung in icicles from the branches fully two feet in length. The effect produced was very beautiful, and served at the same time to illustrate in a striking manner an important feature in the life-history of the plant.

THE MUSEUM.

Before concluding, I wish to refer very briefly to the increasing recognition which Museums are receiving at the hands of our Educational authorities, as aids in the teaching of Nature Knowledge. For example, H. M. Inspector of Schools, in reporting on the Preparatory Department of the Academy, says:—"Miss Raffan is always on the outlook for new educational ideas, and there is always some fresh and attractive feature in her teaching. In connection with the subject of Nature Study the children have had ten excursions to the country. An excellent supply of material for illustrating the lessons has been supplied, and further specimens are easily obtained from the Natural History Museum." In addition to this I might add that Miss Raffan has on several occasions brought her classes to the Museum for practical demonstrations in front of the cases.

During the past summer, the International Association for the Advancement of Science, Arts, and Education held their meetings in Glasgow, when I had the privilege of reading a paper on Regional Museums, with special reference to the use of Museums in elementary education. In a discussion which followed, I was much struck to find how much interest was beginning to be taken in this subject in various parts of the country. One Inspector of Schools from the south of England told me that he had been working very much on the same lines as we have been doing here, and that he would recommend to his friends in the south our plan of Museum Essay Competitions. Speakers from Manchester and from London also expressed similar views. At the meeting of the British Association, also, Sir John Gorst, in his Inaugural Address to the newly constituted section of Education, emphasised very strongly the importance of Natural Science teaching in Elementary Schools, particularly in country districts, and the necessity for practical demonstrations to accompany such teaching. I have reason to believe that ere long we shall see even fuller recognition given by the State to Local Museums, as important factors in the educational machinery of the country. Possibly from this may arise a scheme for the more adequate support of these institutions.

THE SUMMER EXCURSIONS OF 1901.

As I have already said, the past summer has been exceptionally bright and fine, and the Society has been fortunate in having good weather for all its excursions. The attendance at most of these was very fair. The following reports have been prepared by the various leaders:—

1. May 23, to Loch Katrine, conducted by Mr. Wm. Ellison. A party of 17 ladies and gentlemen left by train *via* Dunblane for Callander, where a coach was waiting to convey them to their destination. The morning being very fine, the drive past Loch Vennachar and Loch Achray and through the Trossachs was much enjoyed. It being an ideal photographic day, the photographers lost no time in wending their way along the north side of the loch, keen on taking pretty bits, well known to the guide, en route to the Silver Strand. The "pretty bits" had, however, mysteriously disappeared. On enquiry at some workmen it was found that the ancient landmarks had been removed, and a new road constructed at a greater altitude than the old one, while the level of the loch had also been raised so as to give a better supply of water to the Glasgow people. Much to the sorrow and disgust of the photographers, the charming Silver Strand was not to be seen, being covered with three or four feet of water. After lunch, however, their spirits revived a little, and, notwithstanding the loss of so many good subjects, some nice views were obtained.

It was too early in the season for the botanists, and nothing of importance was met with. The party drove back to Callander, and to tea, which was much appreciated. Perth was reached in the evening, and all agreed that they had had a thoroughly enjoyable day's outing. The only cause for regret was the fact that the President was unable to accompany the party.

2. June 8, to the Banks of the Almond, from Dalcrue Bridge to Almondbank, conducted by Mr. James Menzies. The route of this excursion was somewhat altered from that originally proposed. The party took the 12.20 train to Methven, walking thence to Dalcrue Bridge. The fine example of a trap dyke at the Bridge was examined with much interest. The left bank of the Almond was then explored as far as Woodend. The ground, however, proved unproductive of rare plants, though beautified by a wealth of the commoner wild flowers, amongst which the purple blossoms of the wood cranesbill, *Geranium sylvaticum*, Linn., and the red flowers of *Lychnis dioica*, Linn., were very conspicuous. After tea at Almondbank, a few of the party continued the walk to Perth by the left bank of the Almond as far as the bridge of Almond.

3. June 22, to the Muir of Thorn, conducted by Mr. R. Lawson. The excursionists, numbering five, left Perth by the 12 noon train for Murthly, where they were met by Mr. Lee and Mr. Murray, who had been very kindly sent by Mr. Fothringham of Murthly to assist the party. After leaving Murthly Station we kept by the public road till the Schoolhouse was reached. At this point a pine wood

was entered, and a search made for the Pine Weevil, *Hylobivus abestis*, Linn. Only one specimen was found, although about ninety per cent. of the young larch trees were destroyed by this insect. We then made for the Muir of Thorn, which lies about a mile east of Bankfoot. The Muir is very interesting botanically. Wild orchids were abundant, and several specimens were noted, amongst which were *Habenaria conopsea*, Benth., and *Habenaria bifolia*, R. Br. The Petty Whin, *Genista anglica*, Linn., was also abundant, and was in fruit. A few specimens of Lepidoptera were captured, including *Argynnis silene*, *Chilonia plantaginis*, *Eulobia palumbaria*, etc. The bog is thickly tenanted with Black-Headed Gulls, which, at the time of our visit, were rearing their young in large numbers, and made a fine sight. A few Mallards and Teal Ducks rose as we went along, and a well marked Adder was taken as we were leaving the marshy ground and approaching the public road. A short walk brought us to Bankfoot, and, after having tea there, we drove to Strathord, where we caught the 7 o'clock train for Perth. The weather was all that could be desired, and a very pleasant afternoon was spent.

4. July 6, to Ben Laoigh, conducted by Mr. R. H. Meldrum. Ben Laoigh is a mountain situated in the extreme west of the county, part of it indeed being in Argyllshire. Botanically speaking, it was discovered by Dr. Buchanan White and Colonel Drummond Hay a good many years ago, and since then it has frequently been visited by botanists. Hence its flora, which is rich, is pretty well known.

About a dozen members took part in the excursion. No doubt more would have gone had the morning not looked somewhat threatening. By the time the train was left, however, the sun had come forth, and the weather remained perfect for the rest of the day.

Ascending the Argyllshire Corrie, the party examined the lower series of cliffs, and, after crossing the watershed, confined their attention principally to the same series on the Perthshire side. Most of the characteristic plants of the hill were seen. *Cystopteris montana*, Bernh., was in considerable quantity, and a fair number of plants of *Pyrola rotundifolia*, Linn., occurred, though only one or two showed flowering spikes. *Dryas octopetala*, Linn., was particularly fine, and was much admired. *Saussurea alpina*, D.C., *Bartsia alpina*, Linn., *Hymenophyllum unilaterale*, Bory, and many other interesting species were gathered, while, among mosses, the beautifully coloured *Orthothecium rufescens*, B. & S., was very abundant and in fruit, in which condition it is rare to find it.

The Mountain Club was to have held a meeting at the summit, but, as the most important functionary, the Quaich bearer, was absent, and as time was limited, it was agreed to postpone to next year the celebration of the mysterious and sanguinary rites of this festive club. This brought great relief to the proposed new members, whose nerves had been somewhat unstrung by a few casual remarks on the awesome nature of the initiation ceremony.

After the tiresome walk over the moor between the mountain and Tyndrum, the party adjourned to the Hotel, where the rank and file

solaced themselves with tea, while the leader, in solitary grandeur, partook of refreshment more in keeping with the high position he was that day called on to fill. Perth was reached about midnight.

5. July 27, to Sauchie, near Stirling, and the Howietoun Fish Hatcheries, conducted by Mr. J. G. Goodchild, Edinburgh. This excursion was held jointly with the Scottish Natural History Society of Edinburgh. A large number of ladies and gentlemen from each Society met at Stirling, and the united party drove to Howietoun to inspect the celebrated fish hatchery. Mr. Thompson, the manager, conducted the party over the whole establishment and described each department in an interesting manner. Dr. Craig Wilson supplemented the remarks of Mr. Thompson, pointing out especially the difference in the manner of hatching the ova of fresh-water fishes from that adopted in the case of sea fish, whose ova in most cases is light and floats on the top of the water. Mr. Thompson received a hearty vote of thanks for his kindness in guiding and instructing the party. After leaving Howietoun the party proceeded to the cliffs above Sauchie House, where Mr. Goodchild explained in a lucid manner the geological structure of the district. On returning to Stirling the members of the Perthshire Society were entertained to tea in the Station Hotel by the Scottish Natural History Society.

6. August 17, to the Banks of the Isla, from Coupar-Angus to Cargill, conducted by Mr. Wm. Barclay. On this excursion the party, which consisted chiefly of ladies, journeyed by rail to Coupar-Angus. Here they were met by Mr. W. M. Scott, who acted as a very efficient local guide. On the way to the bank of the Isla, and while passing through a sewage farm, there was gathered, on a rubbish heap, an unknown species of clover, which was afterwards identified in Edinburgh as *Trifolium resupinatum*, Linn. This is not a native British plant, but belongs to the south of Europe. Proceeding along the river bank, it was disappointing to find that as the stream was in flood there was no chance of ascertaining what aquatic plants occur in its bed. Along the margin were seen great masses of the American Pond Weed, *Elodea Canadensis*, Michn., which has, in many parts of the country, become quite a pest. A somewhat local sedge, *Carex aquatilis*, Linn., was found to be very abundant on the marshy ground by the side of the river. As we passed through the wooded portions of the bank, a good many interesting fungi were gathered. In the afternoon, rain, which had been threatening for some time, at length set in persistently, and cut short what had been a very pleasant excursion. The party hastily sought shelter and tea in Burrelton, and in the evening returned by train to Perth.

7. October 12, Cryptogamic excursion to Kinnoull Hill and Kinfauns, conducted by the Rev. Dr. Paul, Edinburgh. The following report and list of species has kindly been drawn up by Mr. James Menzies, who acted as local guide.

As this was the first excursion of the Society for some years specially devoted to fungi, considerable interest was manifested by

the botanical section, and there was a good attendance of members. Work was begun at the entrance gate of the hill, and continued along the western side, and although the season was somewhat advanced, and the soil rather dry, fungi were fairly abundant. The services of Dr. Paul were much in request in identifying the more difficult species. After finishing the western side, the party ascended the hill and then turned downwards under the beech trees near the Kinfauns boundary. Here the finds were even more numerous, Dr. Paul identifying a large group of *Agaricus saponaceus*, Fr., which was particularly conspicuous. Further along, under a silver fir tree, *Cantharellus infundibuliformis*, Fr., was detected by Dr. Paul growing amongst *Cantharellus tubaeformis*, Fr. These two species resemble each other very closely, and the first named had hitherto escaped notice.

A start was now made on the Kinfauns side, search being made for *Lentinus cochleatus*, Fr., which is known to grow here. This fungus is remarkable for the powerful odour of anise which it exhales. It could not, however, be found at this time. Kinfauns proving very barren, the party walked on to the Deuchney Wood. Here some fine specimens of *Cortinarius triumphans*, Fr., were found. This is rather a handsome and not very common species. At this point rain began to fall heavily, and further search had to be abandoned. The result of the day's work was the finding of 84 species of fungi, representing four orders. A hearty vote of thanks to Dr. Paul for his kind services to the party brought this very successful excursion to a close.

The following is a list of the fungi found during the day :—

AGARICINI.

Ag. (Amanita) muscarius, Linn.
,, ,, vaginatus, Bull.
,, ,, rubescens, Pers.
,, (Lepiota) granulosus, Batsch.
,, (Armillaria) melleus, Fl. Dan.
,, (Tricholoma) terreus, Schæff.
,, ,, flavo-brunneus, Fr.
,, (Tricholoma) albo-brunneus, Pers.
,, (Tricholoma) crassifolius, Berk.
,, (Tricholoma) saponaceus, Fr.
,, ,, virgatus, Fr.
,, ,, resplendens, Fr.
,, ,, rutilans, Schæff.
,, ,, albus, Schæff.
,, (Clitocybe) nebularis, Batsch.
,, ,, infundibuliformis, Schæff.
,, (Clitocybe) clavipes, Pers.
,, ,, fragrans, Sow.
,, ,, laccatus, Scop.
,, ,, ,, var. amethystinus.
Ag. (Collybia) radicatus, Rehl.
,, ,, maculatus and its "variety," A. and S.
,, (Collybia) butyraceus, Bull.
,, (Mycena) epipterygius, Scop.
,, ,, purus, Pers.
,, ,, alkalinus, Fr.
,, ,, galericulatus, Scop.
,, (Omphalia) fibula, Bull.
,, (Pluteus) cervinus, Schæff.
,, (Nolanea) pascuus, Pers.
,, (Pholiota) squarrosus, Müll.
,, ,, mutabilis, Schæff.
,, ,, flammans, Fr.
,, (Hebeloma) crustuliniformis, Bull.
,, (Flammula) lentus, Pers.
,, ,, sapineus, Fr.
,, (Galera) tener, Schæff.
,, (Stropharia) æruginosus, Curt.
,, (Hypholoma) sublateritius, Schæff.
,, (Hypholoma) fascicularis Huds.

Cortinarius (Phlegmacium) purpurascens, Fr.
Cortinarius (Myxacium) elatior, Fr.
Cortinarius (Inoloma) pholideus, Fr.
Cortinarius (Dermocybe) cinnamomeus, Fr.
Cortinarius (Dermocybe) subsanguineus.
Cortinarius (Telamonia) armillatus, Fr.
Cortinarius (Phlegmacium) triumphans, Fr.
Paxillus involutus, Fr.
Hygrophorus olivaceo-albus, Fr.
,, conicus, Fr.
,, psittacinus, Fr.
,, puniceus, Fr.
Lactarius turpis, Fr.
,, trivialis, Fr.
,, blennius, Fr.
Lactarius vellereus, Fr.
,, torminosus.
,, deliciosus, Fr.
,, glyciosmus, Fr.
,, rufus, Fr.
,, quietus, Fr.
,, chrysorrhæus, Fr.
,, mitissimus, Fr.
Russula nigricans, Fr.
,, fellea, Fr.
,, ochroleuca, Fr.
,, cyanoxantha, Fr.
,, emetica, Fr.
,, fragilis, Fr.
Cantharellus cibarius, Fr.
,, aurantiacus, Fr.
,, infundibuliformis, Fr.
,, tubæformis, Fr.
,, umbonatus, Fr.
Marasmius peronatus, Fr.
Panus torulosus, Fr.

POLYPOREI.

Boletus piperatus, Bull.
,, scaber, Fr.
,, flavus, With.
Boletus subtomentosus, Linn.
Polyporus versicolor, Fr.
,, annosus, Fr.

HYDNEI.

Hydnum repandum, Linn.

CLAVARIEI.

Clavaria cristata, Pers.

12th December, 1901.

HENRY COATES, F.R.S.E., President, in the Chair.

The President proposed the following resolutions, which were seconded by Mr. R. Brown, and unanimously agreed to, viz. :—

1. That this meeting of the Perthshire Society of Natural Science desires to express its sincere regret at the death of the Rev. H. A. Macpherson of Pitlochry, who, although he had only been a comparatively short time in the district, had taken a deep interest in the affairs of the Society.
2. That a copy of the foregoing resolution be sent to Mrs. Macpherson.

Mr. Gray, on behalf of the Committee of the Marine Station at Millport, exhibited and described a series of specimens which that Committee had presented to the Museum.

Mr. Alex. M. Rodger, as Delegate of the Society to the International Zoological Congress at Berlin held last summer, gave the following report :—

A VISIT TO NORTH GERMANY AND DENMARK.

In August this year I attended the Zoological Congress in Berlin, and at the same time visited several of the Continental Museums.

The Trustees of our Museum, on hearing of my intention, very kindly approved of my going in such a way as to render certain fundamental considerations of small moment.

From Leith to Hamburg is plain sailing—sometimes. Nautical inconveniences, however, are quickly forgotten some 30 hours after leaving the Forth. The sail up the Elbe is smooth and interesting. Heligoland was passed in the early morning while we were still in our boxes.

At Cuxhaven the first pilot takes charge of us, and we steam on past the entrance to the great Kiel Canal, on to Germany's greatest port.

The traveller cannot help feeling the tremendous possibilities of a city such as Hamburg, with its great river, miles of docks and wharves, and he instinctively contrasts it with London, Glasgow, Liverpool, and New York. It is Germany's greatest port, and outside Britain no other city approaches it commercially. With characteristic German method and attention to detail, the visitor is put on shore and through the customs with little loss of time. Then to a hotel. Let me say that hotels are excellent, food very good, tea not fit to drink, coffee delicious, living very reasonable. On engaging your room a form must be filled in stating your name, town, profession, etc. This suggests police.

We set off at once, plan in hand, to visit the Natural History Museum. The Hamburg Natural History Museum is the most modern we saw, having been opened in 1891. It is a massive rectangular building, measuring about 260 by 114 ft. The ground floor contains the mammals, arranged along three walls, while on the left are the mineral and palæontological collections. In the centre of this floor also, on a raised platform, is placed a fine series of skeletons of Whales and other aquatic mammals. These include the Blue Whale, Finner, Narwhal, Swordfish *(Orca)*, and a splendid Blackwhale Skull, containing the balena or whalebone. The series also contains skeletons of the Walrus, the Sea Elephant, etc.

The systematic collection of mammals is arranged in a series of 14 upright cases standing at right angles to the wall, thus forming a series of bays, each of them lighted by a side window, besides sharing the roof-light. The light is good; the fittings seemed to me to be fairly good, though somewhat heavy. There is material in abundance, but I did not admire the method of mounting, the labelling, or the colours employed. A universal khaki colour per-

vades the place. This colour may not show dust readily, but it never looks bright and cheerful, a matter of fundamental importance in a public museum. Along the left wall are 12 desk cases, containing an exceedingly well-arranged and comprehensive Geological collection—Rocks, Minerals, Palæontology. There is also a good series of meteorites, some of which have been cut and polished.

Round the first gallery are arranged the systematic reference collections, and the Director's, Curators', and Assistants' rooms, while on the gallery rail are the shells and insects, arranged in desk cases. The general bird collection is here also, in upright cases.

The third floor contains the Index Invertebrates, Fishes, Reptiles, and Amphibians, as well as the home collection of birds, insects, and molluscs.

A third gallery is devoted to ethnography.

So much for the general arrangements. The lighting is very good, and the display is good. Large areas are set apart for work, and for the storage of duplicate material.

A number of microscopes are placed near the windows on the third floor. These are fitted with large discs, or rotating stages, on which are fixed a series of microscope slides. The visitor has only to turn the disc, when a fine spring clips it as each slide comes into position. On a table alongside are drawings and descriptions of each object.

Another good thing I saw was a number of large jars, each like a small aquarium. In these were shown the life histories of various aquatic insects with the actual stone, weed, etc., which form their natural surroundings. The jars being charged with spirit or formalin gave a most life-like effect.

Hamburg Museum cost	1,300,000 Mk.	= £65,000.
Fittings, ,,	350,000 ,,	= £17,500.
Staff, heating, lighting, etc., for 1900,	113,000 ,,	= £5650.

It is a state museum. On week days (except Monday) the Museum is open from 11 a.m. to 4 p.m.; on Sundays, from 10 a.m. to 4 p.m.

We next made our way to the Botanic Gardens and afterwards to the Zoological Gardens and Aquarium. The animal dens are beautifully arranged, and fulfil the natural conditions of the animals as far as space permits. The Aquarium is in a sunk area within the Zoological grounds. Light is admitted mostly through the top of the tanks, so that the visitor is in partial darkness. They have a number of Turtles, Giant Salamanders from Japan, Axolotls, Olms, etc., and a great many kinds of fish, both salt and freshwater forms. Of Invertebrates there are quite a host of different sorts, Tunicates, Octopuses and other molluscs; Crustacea of many kinds, including Limulus, the King Crab, from the Pacific. A wonderful sight was a tank containing marine worms. Another contained Echinoderms, and a third sponges.

What caused me the greatest surprise in Hamburg was a visit to the animal dealers. Of these there are a number, but I saw only two. Setting off to the north-west of the city, to the address of Umlauff

Bros., I expected to find a little naturalist's shop in a back street. Arriving at the shop, I was conducted through premises as large as the Perth Academy, and where over 50 people are employed in receiving, preparing, and sending off all kinds of natural history objects, except insects. Skins and skeletons of such large mammals as the elephant, the camel, the giraffe, the hippopotamus, the rhinoceros, the whale, and of other large vertebrates, are to be seen packed away in the rough, and these may be had mounted and delivered on the shortest notice.

An enormous business is done in shells, which are imported by the ton in the rough from all parts of the world. They are cleaned and sold by the lb. or doz. This explains why it is that sailors often bring home East Indian shells from the West Indies! In the work-room I saw the largest gorilla which has ever been brought to Europe. It was mounted; the stuffed skin in one case and the skeleton in another. Two days afterwards these cases were purchased by the Hon. L. W. Rothschild for his museum at Tring.

Carel Hagenbeck, dealer in live animals, was next visited. His establishment is, I understand, the largest in the world, and covers an extensive area. He had in stock a handsome collection of lions, tigers, bears, etc., indeed the finest we saw.

To Berlin by express occupies 4 hrs. The country passed through is flat, and for the most part uninteresting. Life in Germany is very pleasant. It is wonderful how very like ourselves the people are. Our insular idea of the average German, somehow, is founded on pork butchers and brass bands. The Berliner is always polite, and ever ready to assist and direct a stranger.

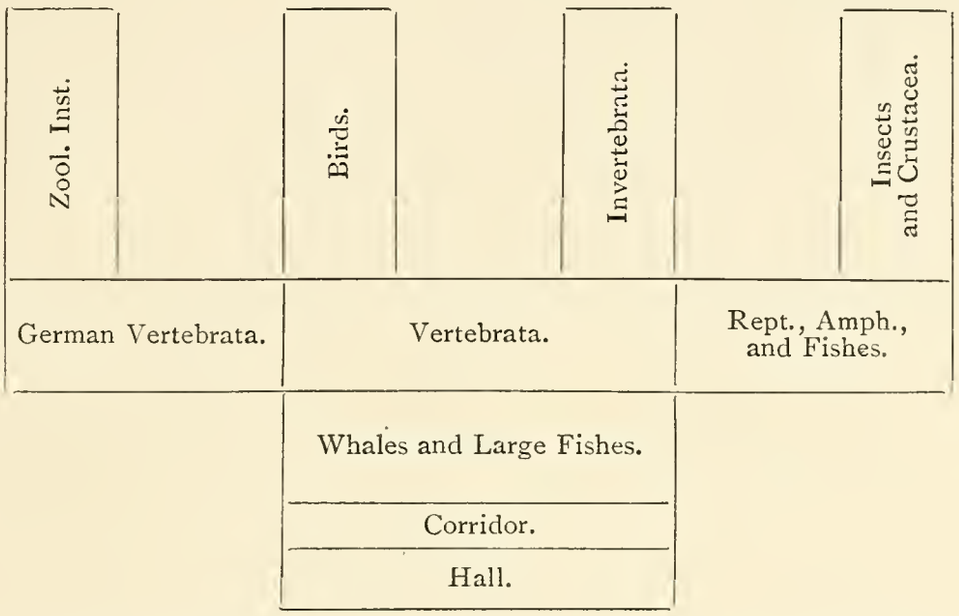
The Fifth International Zoological Congress was held in Berlin this year. It is a triennial gathering. The meetings were held in the Reichstagsgebude, or Parliament House, a fact which clearly shows the German regard for science. The first meeting was a full dress affair, and was held at 9 a.m., a most extraordinary time of day to turn out in evening dress. After the formal remarks by the President, Prof. Mobius, Director of Zoological Museum, Berlin, the first paper was given by Prof. Grassi, Rome, well known for his researches into the causes of malaria. His subject was, "Malaria from a Zoological point of view," and he gave an interesting account of the diseases caused by insect stings, and emphasised the importance of their study. Papers of general zoological importance were read before the whole Congress, whilst those of more restricted scope were read to the separate sections.

Arranged in the corridors of the Reichstagsgebude were numerous exhibits by natural history dealers, many of which were most tempting. A series of Type vertebrates and invertebrates injected to show the arterial and venous systems in red and blue, was extremely beautiful. There were also large and showy insects, specimens arranged to show life-histories of various insects, insect pests, etc.

Prof. Ijima of Tokyo, to illustrate his paper on the Hexactinellid sponges (Glass-sponges), exhibited a most beautiful collection of these from Japan.

The Berlin Zoological Museum.—This museum is contempor-

aneous with the University, dating from 1809, but the collections became too large for the building which contained them. The present building was opened by William II. on December 2nd, 1889. It is an enormous building of three stories, and consists of ten large rooms. The ground floor only is accessible to the public. The upper floors are divided into rooms for storing duplicates, work-rooms, offices for the staff, etc. The staff comprises a director, 18 zoologists, 5 preparators, 7 assistants, and 6 attendants.



Part of the building is lit from the roof, the rest from side-windows only. The cases are mostly of iron framework, with sheet glass, painted inside an ochrey yellow. They are arranged to form bays in some rooms, whilst in others they are continuous along the whole length of the room. In the room for the invertebrates a number of the windows have frames to support transparent and semi-transparent animals, such as tunicates, molluscs, worms, and anemones.

The museum is enormously rich in material, including many Types and rare original specimens, as well as the collections of many travellers and explorers.

The Zoological Gardens of Berlin are said to be the finest in the world. That I can quite well believe, but to describe them is beyond my power. I saw there such rarities as the Musk Ox, the American Bison, the European Bison, the Giraffe, the Chimpanzee, etc. I was also much interested in seeing the South American Condor, the species recently presented to us and now mounted in our museum. One example which I saw was brought to the Gardens in 1852, but to my eye it did not appear to be so large as our specimen.

The Aquarium of Berlin is in the main street—the Unter den Linden. It is arranged as a grotto, and lit with electric incandescent lights. There is a most extensive and varied collection. Indeed everything that it is possible to procure and keep alive is to be found there, such as amphibians, fishes, and invertebrata.

In Berlin there are many museums, but time does not permit me to do more than mention a few:—The Anatomical Institute, the Botanical Institute, the Forestry Department Museum, the Geological and Palaeontological Institute Museum.

Then there is the Volkerkunde or Ethnographical Museum, the finest museum I saw in Germany. This museum is practically fire-proof, built of stone, with cement floors supported by iron pillars and girders. The cases, too, are constructed of iron, the only wood in the place being an isolated form or two for sitting on.

Here are conserved the famous Schliemann collections, brought together in one large room. As some of you know, Schliemann worked for 12 years (1871-82) in Asia Minor, excavating what is described as the ancient City of Troy.*

One word more and I have done with Germany's museums. In October, 1899, Deutsches Kolonial Museum was opened by the Kaiser. The use of this museum is to show the various foreign possessions of Germany, and to bring prominently before the public the imports and exports of these countries. In it are to be seen large maps showing the routes, native settlements, depicting the habits of the people and the produce. A separate hall also is set apart in which are exhibited the products exported and lists of imports.

I have said nothing about the great Art and Military museums, as these are outside my province; but they are great, and worthy of a great nation.

On my way home I came by way of Copenhagen, and visited the University Museum. It was opened about thirty years ago. It is an enormous building, with a wealth of collections, and is much overcrowded. The main museum is rectangular, and has two galleries, lighted from the roof. On the ground floor is a collection of mammals, the chief feature of which is a huge case containing a series of giant edentates—extinct sloth-like animals which formerly ranged throughout South America.

This priceless and interesting group was brought together through the efforts of Drs. Lund and Lausen, and was presented in 1845 before the exportation of such remains was prohibited by the American government.

This museum is also very rich in Arctic fauna. Two examples of the Great Auk are there, as well as enormous collections of Arctic crustacea, mollusca, etc. The Whale collection exceeds that of any other museum I have ever seen, and never even in Arctic waters have I seen such a school.

There is a staff of six curators, with assistants. The curators work three hours a day for the museum; the rest of the day is devoted to original work. This, I think, gives us a reason for the abundance of Continental literature in all branches of Natural Science.

To sum up, I must say that the museums of Natural History which I saw are not to be compared with the American museums in matters of detail. Take the question of the general colour of the interior, a point already referred to, this in German museums is too dull. The exhibits in the vertebrates are uninteresting, because the animals are exhibited without any attempt at giving the natural surroundings, and because they are often poorly mounted, while the label,

* *See* Troy, "Chambers' Encyclopædia," and "Encyclopædia Britannica."

if printed, gives no information beyond the name and the locality. The reason is, I think, that the German is content to possess the thing itself, and to leave the descriptive part to handbooks, which, by the way, are very good. In the old museums the architectural work was left too much to the architect, and, as a result, we see beautiful halls suited for almost any other purpose but that of a museum.

The following paper was read :—

"The Criminal." By Dr. Urquhart, Murray's Royal Asylum.

9th January, 1902.

HENRY COATES, F.R.S.E., President, in the Chair.

The President exhibited a case of Humming Birds from Ecuador.

The following papers were read :—

1. "The Geology and Mineralogy of Creag na Caillich." (See *Trans.*, Vol. III., Part IV., page 155).

2. The Blood Vascular System in Animals." By James Stewart, L.D.S. The paper was illustrated by numerous diagrams.

13th February, 1902.

HENRY COATES, F.R.S.E., President, in the Chair.

Mr. R. H. Meldrum recorded the finding of a rare Moss, *Aulacomnium turgidum*, Schwgr., on Ben More by Professor Barker of Stockport.

Mr. M'Intosh, Inver, sent specimens of Fungi, which were on exhibition. Mr. M'Intosh also forwarded the following note, which was read by Mr. Barclay :—

"I am sending specimens of fungi which grow on the dead branches of trees, such as the oak and the beech. These fungi are *Corticium comedens*, Nees, and *C. quercinum*, Pers. They are both common, and grow most vigorously during the late autumn and winter months. My purpose in sending them is to show that they have been nibbled by squirrels, and that they have undoubtedly been used by them as food. In such seasons as the present, when the crop both of cones and of beech mast is scanty, squirrels feed to a considerable extent on both these fungi, but especially on *C. comedens*. This is easily seen from the numbers of these fungi which are marked by the teeth of squirrels, as in the case of the specimens which I have forwarded.

"Besides these two fungi, it is well known that squirrels in the late summer and autumn months feed largely on what may be called toad-stool fungi. A great favourite with them is *Ammanita rubescens*,

Pers., which abounds in woodlands. It comes early, and is said to be edible; at least the squirrels find it so. They are in the habit of breaking off a pretty large piece from this or one of the other fungi eaten by them, and then betaking themselves to the branch of a tree to nibble it there at their leisure. I have seen them with a piece of a bright-coloured white-spotted one which looked suspiciously like *Ammanita muscarius*, Linn., a very poisonous species, and they also feed on some bright-coloured species of *Russula*, a genus of which most of the species are poisonous. *Boletus edulis*, Bull., is a favourite with them, and there are also other *Boleti* eaten by them. Another fungus which is used by them as food is *Hygrophorus hypothejus*, Fr., which is frequent in pine woods and comes late in the season.

"After writing the above, I came upon an extract from 'The Gardener's Chronicle,' which is as follows :—

'"B," writing to the "Gardeners' Chronicle" on a recent lecture by Mr. Tom Speedy, the well-known Scots naturalist, on the squirrel, says :—For the pretty, nimble little creature the lecturer had nothing good to say. It is stupid, and when it buries nuts does not always remember the locality of its hoard. It is dirty in person, and provides food, with a warm lodging, for a vast parasitic population. But these are merely personal characteristics, of interest to itself alone. When it caters for its own food, the outlook includes other interests of great importance. Its food consists usually of fruit, nuts, acorns, haws, fungi, the cones of pine, the young shoots and bark of conifers and other trees, toadstools, and birds' eggs. The damage effected by the squirrel on pine woods in the north of Scotland is so great that on some estates, in order to get rid of the "plague," as much as one shilling is paid for every squirrel's tail. As many as 1000 to 1200 are killed annually on a single estate, yet their numbers are never lessened, and damage to the plantation is unabated. Exactly the same state of matters exists on south country estates, but, the woods being of less extent, less trouble is required to destroy them. The writer is aware of many young plantations, not only larch, but pure Scots fir, which have been completely ruined by visitations which lasted only a few days. Squirrels are extremely fond of sycamores and true planes, and peel great strips of bark off young trees up to 20 feet in height, while the young buds in early spring provide a favourite dish.

'During the past year, especially in summer and autumn, squirrels have been the cause of great loss in gardens. One gardener assured me they carried off a fine crop of apricots in the course of a few days, almost before they were noticed. These trees are protected in spring with glass copings and movable blinds, and it may be said that every effort is made to secure good crops to be eaten by—squirrels! I have heard of several instances, too, where pears, quite hard and only half-grown, had been carried off; of peaches on walls denuded of the fruit before it was stoned, and many other instances of crops utterly ruined. It becomes a much more serious affair when it happens that squirrels are preserved, and the gardener is advised not to interfere with them. I have heard of a canny Scot who, placed under these very aggravating conditions, possessed himself of a birch-broom, with a handle longer than usual, and with that instrument "swept" his trees at the moment one of his foes happened to be intent on getting supplies! Squirrels are easily caught by means of ordinary rat-traps placed on the top of walls, along which they may travel to reach the tree they visit. It is seldom indeed that a squirrel fails to go straight into a trap, and if it does swerve aside, the removal of the trap to another part of the wall is sufficient to cause it to forget its caution. I have known wire-netting, fixed at an angle of 45 degrees on the top of a wall, and stretching over the fruit tree, prove an effective barrier, but in a big stretch of wall it becomes rather expensive.'

"I suppose that the statements made in the foregoing are correct, but the peeled sycamores are rather tall, and the gardener with the broom!—well, the squirrels must have been canny. I believe they

are troublesome at the Dunkeld House gardens, but they have never harmed the gardens about the village here (Inver), and it is a new thing if they have become troublesome or destructive about Dalguise, where there is fruit grown, or Kinnaird House gardens, about all of which places squirrels are plentiful. Sycamores, planes and maples have been planted plentifully in this neighbourhood, but I never heard of their being peeled by squirrels to any great extent, rabbits being the great sinners in this respect. Either the squirrels or the bullfinches nip the flower buds of the maples, but I cannot say which animal does the harm, as I have never caught them in the act. As far as I can learn, pines are not damaged by squirrels in this district to any great extent. It looks as if the squirrels were getting demoralised in some quarters, but is it not a question of the supply of their ordinary food being short? Scott, the keeper at Inver Wood, told me that last summer he heard a pair of thrushes making alarm calls in the wood as if a cat were at hand. He went quietly toward them, and saw a squirrel with something in its mouth. Having shot the squirrel, he found that it had caught a nestling thrush and was in the act of eating it."

There was also exhibited a specimen of a very rare dipteron, *Xiphura atrata*, Lin., found by Mr. Wm. Wylie at Scone, and identified by Mr. Grimshaw, Edinburgh. Mr. Rodger, in looking over the collections of the late Dr. Buchanan White, which are now in the Museum, has since found a goodly number of specimens of the same insect collected by Dr. White in various localities of Perthshire and other counties of Scotland.

On the motion of the President, it was agreed to record in the Minutes the Society's regret at the death of Mr. Donald MacGregor, Battleby, who was an earnest student of Botany, and the Secretary was instructed to send a letter of condolence to Mrs. MacGregor.

The following papers were read :—

1. "Notes on certain Perthshire Fungi." By James Menzies. The paper was illustrated by a series of lantern slides. (See *Trans.*, Vol. III., Part IV., page 175.)

2. "The History and Culture of the Grape Vine," Part II. By John Leslie, Pitcullen. (See *Trans.*, Vol. III., Part IV., page 185.)

13th March, 1902.

THIRTY-FIFTH ANNUAL MEETING.

HENRY COATES, F.R.S.E., President, in the Chair.

The following Reports were read and adopted :—

REPORT OF COUNCIL.

The Council, in submitting their Thirty-Fifth Annual Report, are pleased to be able to again present one of a satisfactory character.

During the past year 6 Monthly Meetings have been held, at which 9 papers and the 2 usual Addresses of the President were read.

The attendance at the Meetings continues very regular, the average being about 42. The greatest number at one Meeting was 52 on the 14th March, 1901, and the lowest attendance 30 on 9th January, 1902.

Twenty-five Ordinary Members have been admitted during the year, making a total membership of 418, including 1 Honorary, 12 Corresponding, 12 Associate Members, 8 Associates, and 385 Ordinary Members.

During the summer months, 7 Excursions were held. The number attending these Excursions was rather irregular, and your Council hope that in the future more Members will try to avail themselves of these pleasant outings. What has now become an Annual Excursion was the Joint Meeting with the Scottish Natural History Society of Edinburgh, at Sauchie, near Stirling, where the party had the pleasure of seeing over the Howietoun Fish Hatcheries. A new feature this year was the Fungus Excursion, at which the attendance was very good, and which seemed to create a good deal of interest amongst the Botanical Members. The Council again desire publicly to acknowledge their indebtedness to several proprietors for granting permission for some of the Excursions, and also to the various leaders for their services.

The Children's Essay Competition for prizes offered by the President shows a large increase in the number of competitors, the essays sent in being 118, against 81 last year. The competition is to be continued again during the current year, the Essays to be sent in before 31st December, the subject being "The Insects of Perthshire."

Death has again removed some of our active Members, the Society having lost during the past year the Rev. H. A. Macpherson, of Pitlochry, and Mr. Donald MacGregor, of Battleby.

The use of the Lecture Room has again been freely granted to various local Societies.

The Visitors to the Museum during the year numbered nearly 13,000.

REPORT OF TREASURER.

(See Balance-Sheet, page cxxxiii.)

REPORT OF TREASURER TO THE MUSEUM FUND.

(See Balance-Sheet, page cxxxiv.)

REPORT OF CURATOR.

Perthshire Museum.—The only addition to the Mammal Cases of this department is a group of Water Voles, a very black variety.

It is almost four years since our local Bird Collection was overhauled, so this summer we went carefully over each bird. New labels were prepared and varnished to replace the somewhat faded series which had done service since 1895. It may be noted that

during this operation our good friend the Janitor cleaned about 2000 square feet of plate glass.

The only addition of importance to this collection is a male Waxwing in adult plumage.

The Fish Case is undergoing a complete change. The glass cylinders are to be abandoned, and square tanks constructed of plate glass are to take their place. About ten of these, varying in size from 12 in. by 6 in. to 3 ft. by 9 in., are already constructed. These permit the placing of the fish in their correct position, instead of standing on their tails, and the exhibiting of them amid their natural surroundings. In the case of the Salmon and Trout the life history is also shown.

The Invertebrate Collection has received an important addition, namely, the collections of Perthshire Lepidoptera formed by the late Sir Thomas Moncreiffe, which have been handed over to the care of the Society by Sir Robert Moncreiffe, Bart.

The subject of the recent Children's Essay Competition, "The Trees of Perthshire," included not only the native trees, but the choice of a number of introduced forms. It was thought advisable, therefore, to extend the tree section to include six of the more important of these. In the meantime this extension into the Invertebrate wall case will remain until the section is required for the completion of the Perthshire Invertebrate Animals.

Mr. R. H. Meldrum sends the following note on the Moss Collection:—"During the winter the Perthshire Mosses from the late Dr. White's Herbarium have been examined and mounted in a suitable manner. At the same time, specimens collected by Mr. M'Intosh of Inver and the late Mr. Martin of Aberuthven have been incorporated, and I have added a large number from my own Herbarium. Only a few critical species now remain unmounted. I hope that ultimately each species may be represented from every district in which it occurs, and that those Members who have recently shown an interest in Bryology will contribute to this end by collecting specimens for mounting. The commonest species are most required from many of the districts."

The Fungi have received considerable attention this year, and over 60 species of the Agaricini have been collected by Miss Miles and Mr. Jas. Menzies. These examples were all photographed by Miss Jamieson or myself, and afterwards preserved in spirit. A part of the Herbarium has been fitted with shelves, and in these they are arranged.

Index Museum.—Three more cases have been fitted up in this department on the tablet system. First, the *Protozoa*. As all the animals comprised in this group are small, indeed, mostly microscopic, models and drawings are largely used. In the second case the *Sponges* are shown to splendid advantage on the black tablets, particularly the siliceous forms, of which the Museum now possesses a fine collection. The commercial sponges also are well represented. In both cases white sketches on black tablets illustrate the structure of the groups.

The third finished case contains the class *Amphibia*. In this the central tablets show the anatomical features, and on the left are

arranged the frogs and toads, the *Ecaudata*, which lose their tail in adult life. On the right are the *Caudata*—newts, salamanders, and their allies—which retain the tail throughout life. Along the base are arranged the Apoda, or limbless, worm-like amphibians, and a reduced model of a giant salamander which existed in later palæozoic times.

In the centre upright cases, Nos. 37-40, a series of exhibits are in process of arrangement, based on Mr. G. H. Carpenter's designs in the Dublin Museum. These define and illustrate a species, genus, family, order, class, sub-kingdom; variation in size, form, and colour of animals; ways of gaining a livelihood; structures for offence and defence; instincts for defence; warning colour, mimicry; and similar parts in different animals.

A number of additions of special interest have been made to the Index Museum during the year. The pair of Ecuador Condors presented last year have been mounted in a large case amid suitable surroundings of rock and lichen. Mr. Sidney Steel very kindly undertook to paint as a background for this case a view of Chimborazo, which greatly enhances the whole effect.

A young elephant has been added to the collection. Although only a baby eight months old, it is an excellent specimen of the taxidermist's art. The skull of this same specimen, as well as that of a Dugong, were also acquired.

Whilst I was in Germany last summer I purchased a small representative collection of 70 species of Orthoptera, embracing in all 180 specimens.

The collection of 30 specimens from Millport Marine Station is a valuable addition, illustrating the more common animals to be met with on our coasts. They are beautifully mounted and preserved in formalin. This gift is from Mr. James Coats, Jun., Paisley.

The Museum has been well taken advantage of throughout the year, the number of visitors being 12,880.

A class was formed for working men desirous of acquiring the rudiments of Geology, Botany, and Zoology. As the course was to be a series of demonstrations rather than lectures, the number to attend was limited to 18. The Geology course was given by Mr. H. Coates, and was much appreciated by the men; the Zoology, which is to begin almost at once, will be given by myself; and the Botany is to be conducted in May by Mr. Wm. Barclay.

Since the New Year 56 Zoological and Botanical specimens have been lent to various schools, and 7 classes have visited the Museum for special lessons in Nature Knowledge. Since this subject was entered in the Code many teachers have availed themselves of the facilities placed at their service by our Museum.

The Art Master of the Academy has been granted the use of a series of birds to be used in his department for art studies.

The Nature Knowledge Class at the Academy, formed for Pupil Teachers, has visited the Museum on several occasions, under the direction of the Science Masters. They were given the use of the Lecture Room, and the Index Geological and Botanical cases were at their disposal for demonstrations.

The children preparing for the Essay Competition were frequent

in their visits this year in school hours, under the supervision of their teachers, and out of school hours many of them constantly visited the Museum.

REPORT OF LIBRARIAN.

During the past year over 50 volumes have been added to the Library. Of these 746 have been purchased by the Society, and the remainder have been presented. Thanks are once more accorded to the donors of these works.

A glance at the Library shelves will reveal the fact that their capacity is becoming severely taxed, and the time is rapidly approaching when the accommodation of books will become a serious problem.

Another result of the increase in the number of books is that the necessity for a new catalogue is becoming clamant. The work of compiling this catalogue has already been commenced, and it is hoped that it will be ready for issuing before next season.

Forty-five Members have borrowed books during the year, and 185 books have been issued from the Lending Department. In addition to this, the Reference Library has been largely taken advantage of. Only those who are actively engaged in Natural History study can form an idea of how valuable the Reference Library is, and what a boon it is to those who would be otherwise debarred from carrying on such study.

REPORT OF EDITOR.

The Third Part of Vol. III., New Series, of the *Transactions and Proceedings* of the Society has been published and issued to Members during the year. Copies of the Society's *Transactions and Proceedings* have been sent to 37 Institutions (British and Foreign), and in exchange many valuable additions to the Library have been received.

The following Office-Bearers were elected :—

President—Henry Coates, F.R.S.E.
Vice-Presidents—The Right Hon. the Earl of Mansfield, James Menzies, Miss M. Thomas, L.L.A., Miss Macnab, L.L.A.
Secretary—S. T. Ellison.
Treasurer—Alfred Brown.
Librarian—James Coates.
Editor—William Barclay.
Councillors—R. D. Pullar, Robert Lawson, Atholl MacGregor, James Stewart.
Curator—A. M. Rodger.
Treasurer of Museum Fund—James Morison.

The President then delivered the following Address :—

Ladies and Gentlemen,—As you are aware, my Address is put down in the Syllabus for the April meeting, along with Mr. James Stewart's paper. Owing, however, to the lamented death of Mr. Macpherson, and also to my own impending visit to America, it has

been necessary to alter slightly the order of proceedings. The April meeting will not now be held, and my intended Address will, for obvious reasons, be reduced to the limit of a very few remarks.

From the Reports which you have just heard, it will be apparent that all branches of the Society's work are being carried on with unabated vigour. In this connection, I had intended, if time permitted, to have continued the "Annals of the Society" from the date at which Dr. Buchanan White left them off, in 1881, down to the end of the 19th century. This, however, I hope to do on some future occasion, in order to show the steady progress which the Society has made during the 35 years of its existence.

There are two references in the Reports which show, I think, that the Society is not selfish in its aims, but that, on the contrary, one of its chief objects is to diffuse a love of the Study of Nature far beyond the limits of its own members:—I refer to the Lectures to Working Men and to the Children's Essay Competition. To myself, personally, it was a source of the greatest pleasure and satisfaction to give a course of two or three Lectures and Demonstrations on the Principles of Geology to an audience composed entirely of students eager to know something more regarding the structure of the earth on which they live, and at whose unsolicited request the class was organised. The demonstrations also gave an opportunity of explaining in detail the lessons which the Museum collections are intended to teach, regarded in the light of illustrations to a series of Text Books of Natural Science. It is intended to follow up the classes with one or two special Excursions during the summer.

Regarding the other subject to which I have referred, namely,

THE CHILDREN'S ESSAY COMPETITIONS,

I think I am safe in saying that these are fulfilling the purpose for which they were instituted in a way which has even exceeded our expectations. The Essays sent in show a continued increase, not only in numbers, but also in the care bestowed upon their composition, and in the evidence they bear of original observation. I am more than ever convinced that one of the most important aims of education should be to enable pupils to write correct, fluent, and graceful English, and this is a view which the Education Department has emphasised in the most recent Code. Perhaps the best way in which this can be accomplished is to ask the pupil to write upon a subject in which he or she is really interested, rather than upon a more stereotyped subject set as a school task. It is astonishing what a large amount of ignorance prevails amongst many people, who are otherwise well educated, regarding even the most elementary rules of syntax and punctuation. If what I may call our "Free-hand" Essay Competitions should do anything to assist our teachers to save the rising generation from this slur, our efforts will not have been in vain.

As regards originality of observation, I shall quote just one or two brief passages, to show that the competitors have not been content to take their information at second-hand.

One girl of 13 writes as follows:—"Living between the districts of

Murthly and Dunkeld, the greater part of these being finely wooded, I have the advantage of seeing many fine specimens of the various trees grown in our country. It is a very beautiful sight to look along the valley of the Tay; for the different shades of green, all blending together, adorn the hills on either side, and, although the trees are of different greens, yet each shade seems to agree with all the others."

Another girl of the same age, living in Perth, begins her essay as follows:—"A great deal of the beauty of landscapes is due to the trees, in whatever season it may be, more especially in summer and autumn. In this respect, Perthshire can hold its own, with its woods and forests."

A girl of 11, living in Kinnoull, begins as follows:—"Few counties of Scotland are so beautifully wooded as Perthshire or have so many varieties of the trees native to Scotland. On the slope of Kinnoull Hill one can find almost the whole of the trees native to the County. At the water's edge may be found the willow, and along the base of the slope the chestnuts and the lime, and in ascending you pass the the region of the beech, the oak, and the ash, and on to the summit, where grow the hardy larch, spruce, and Scots fir."

Another essayist begins with an historical retrospect, as follows:—"Nothing is more characteristic of Scotland than the wooded nature of its surface. This was not always the case, however. Only round the houses of the country gentlemen, or the kirks, were groves of trees to be seen. Forests were of great extent far out of reach in inaccessible glens. Trees have, however, been introduced and planted, until now Scotland is one of the most picturesque countries in the world. Visitors come from all parts to see its beautifully wooded glens and straths. As is the case in almost all countries, some parts of Scotland are more beautiful than others, and the County of Perthshire takes a prominent place in this respect. It is richly wooded, having trees both useful and ornamental."

It will be seen from these latter quotations that the boys and girls of Perthshire are not lacking either in patriotism to their native country, or in loyalty to their own county.

My last quotation is from the essay of a boy of 14 living at Birnam:—"Sir Walter Scott, the great Scottish novelist, commences one of his most famous novels, namely, *The Fair Maid of Perth*, by saying and partly proving that the County of Perth is the most beautiful in Scotland. Without doubt it owes much of its beauty to the presence of woods, varying in hue and appearance. The trees grow in different situations, according to the places where they can grow best, or according to their hardiness. First, on the mountains and in exposed situations, we find the 'Evergreen Pines,' stately in appearance, the dark green colour of which contrasts beautifully with the bright green of the larch Second, in the valleys and sheltered situations, deciduous trees of many kinds are to be seen, such as the oak, the beech, the ash, the birch, and others, affording a great variety of colours, both in bark and foliage. There grow along the river sides deciduous trees of the same kind as those in the valley, but there are some trees almost peculiar to such situations, such as the weeping ash, the weeping birch, and the willows."

The same essayist, after describing the general characteristics of the oak, adds the following bit of local colour:—"I live very near the last oak of Birnam wood, and so I can say what I have observed in it. This enormous tree is said to have been one of the oak trees of Birnam Wood when Macduff and his army passed through that wood. If so, it must be at least about 900 years old. Its girth is about 27 feet, and the spread of its branches is very great, I should say about 300 feet in a circle. The bark is furrowed deeply, and very rough. The branches would each form a tree of no mean proportions, for their girth extends from three to four feet, and they go out from the tree horizontally. Hence the weight of the branches is much greater than if they went upwards, and, in consequence of this, the tree requires a great girth to support these enormous limbs." In speaking of the ash, he refers to an ash tree which used to grow at the entrance to the Strathbraan Road, but was blown down during the last equinoctial gale. Regarding this specimen, he says:—"I counted its age by the rings, and found it to be about 160 years old. From this I concluded that the ash is of rapid growth, and attains a good height in a short time. The branches of the ash are thick, and have a general upward direction. Hence the trunk does not require to be of great size. The fact that the branches grow upwards indicates that the tree reaches a good height."

I should mention that the essay from which these last quotations are made, and which shows a remarkable amount of originality throughout, is by James Hutton, Birnam, who gained the medal for his essay on birds in 1900.

ENDOWMENT OF MUSEUM.

I come now, in the last place, to speak of our Museum. The educational value of the Museum, under the direction of a skilled Curator, has become more evident, and more widely recognised, each year. The question which we now have to ask ourselves is, are we to allow its career of usefulness to be brought to a close for want of adequate support? I may remind you of the position in which the matter stands at the present time. Experience has proved that the amount required to keep up the Museum in a thoroughly efficient manner is £300 a year. Towards this amount the Society is unable to make any contribution, as the whole of its income, amounting to about £100, is required to meet its ordinary expenses, including printing, upkeep of library, etc. In those circumstances, the Society resolved, on 18th August, 1896, to offer the Museum as a free gift to the City, to be administered, along with the Sandeman Library, under the Free Libraries Act. At that time, however, the Town Council did not see their way to accept this responsibility, and, therefore, a Guarantee Fund was raised, sufficient to maintain the Museum in full efficiency for a period of five years. Four of these have now elapsed and we shall soon be face to face with the problem again. I do not think it will be practicable to continue the Guarantee Fund indefinitely from year to year, but at the same time I feel certain that it is the determination of all interested that the Museum shall not be permitted

to decline for lack of adequate support. I see only two solutions to the problem. The first is, that the Local Authority should obtain power to levy a special rate of ½d per £1 for the Museum; while the second alternative is, that a fund should be raised sufficient to at least partially endow it. If a sum of, say, £5000 were raised for this purpose, I think there can be no doubt that the Town Council would see it to be to the advantage of the community to take over the custody of the Museum, in order to conserve it for the free use of the public in all time coming. The task, therefore, which we have to set ourselves to accomplish within the next twelve months is to get together such a sum as this, in order that our labours during the last 35 years may not become altogether fruitless.

PHOTOGRAPHIC SECTION.

Of the Summer Excursions during 1901 the most successful was to Scone Palace on 29th June. Several good pictures were secured, but Scone Palace is a place at which more than one afternoon would have to be spent in order to discover all the interesting bits.

The Winter Session opened on November 14th, 1901, with a Social Meeting and Private Exhibition of Members' Work. A large number of exhibits were forward, including examples of prints on linen and silk. Lively discussion and criticism followed. A number of songs were sung at intervals, and altogether an enjoyable evening was spent.

On December 26th the Secretary gave a demonstration on Slow Bromide Paper. A number of questions were asked, and the Members present declared that they had greatly enjoyed the demonstration.

At the Monthly Meeting, on January 23rd, Mr. H. Coates presided over a large gathering to hear Mr. J. Sime give his lecture, "In Sweden with a Frena." On the motion of Sir Robert Pullar a very hearty vote of thanks was accorded Mr. Sime for his able lecture.

Mr. Coates intimated that the Photographic Convention of the United Kingdom had written to the Magistrates asking if they would be willing to receive the Convention if it should come to Perth next year. The Magistrates had asked Mr. Coates if the Photographic Section would co-operate with them in receiving the Convention. On the motion of Sir Robert Pullar it was unanimously agreed to do this.

A very successful Exhibition of Members' Work was opened in the Sandeman Art Gallery on March 6th; 148 pictures were forward, being 38 more than last year, and showing a very gratifying advance in quality.

LIST OF DONATIONS TO THE MUSEUM AND LIBRARY,

FROM 1ST APRIL, 1901, TO 31ST MARCH, 1902.

I. PERTHSHIRE COLLECTION.

Polecat, *Mustela putorius*, Lin.—Mr. John Stewart, Princes Street.
Water Vole, black variety (old male and young)—Mr. M'Farlane.
,, (female)—Mr. Young.
Ptarmigan, Greyhen, Blackbird—Mr. P. D. Malloch.
Swift (female)—Mr. George P. M'Dougall.
Crested Grebe—W. H. Cox, Esq.
Robin (young male)—Mr. J. H. Middleton.
Waxwing (male)—Mr. John Bruce.
Tern (young)—Mr. P. D. Malloch.
Redstart (young male)—Mr. F. Hart.
Bullfinch (male adult)—Mr. Alex. Robertson.
Long-tailed Tit (male)—Mr. A. C. Smith.
Blackbird (male)—Miss C. M. Drummond Hay.
Trout (eggs, parr 1, 2 years)—Mr. Thomson.
Salmon Smolt—Mr. Alex. Davidson.
Salmon (eggs, fry)—Mr. A. H. Lumsden.
Lepidoptera, 19 species—Mr. R. Lawson.
Diptera, 20 species—Mr. Wm. Wylie.
Winter Moth and Winter Beauty (females)—Mr. Wylie.
Mosses (additions to collection)—Mr. R. H. Meldrum.
Moss, *Aulacomnium turgidum* (original specimens from Ben More)—Prof. T. Baker.

II. INDEX MUSEUM.

St. Kilda Tup, 4-horned—Rev. J. M'Lean.
White Whale (young)—Capt. Adams.
Flipper of Black Whale—Capt. Wm. Adams.
Pheasant (male), golden and silver—W. F. Middleton, Esq.
2 Sun Birds, *Nectarinia famosa*—Mr. J. Hutchison.
Nest of Willow Wren—Mr. Charles MacIntosh.
Nest of Sisken—Mr. Wm. Hunter.
Nest of Weaver Bird—Mr. Wm. Hunter.
A collection of Guillemot Eggs to show variety of markings—Capt. Adams.
Forked Hake, *Phycis blennoides*—Mr. A. Speedie.
15-Spined Stickleback—Mr. Arch. Gray.
Fish, *Labrus rupestris.*
,, *Blennius pholis.*
,, *Pholis gunnellus.*
,, *Gastroceus spinachia.*
} Millport, per James Coats, Esq., Jun.

CORRECTIONS.

Page cxxix, lines 10-33, for "Sea-pen," "Echinoderm," and "Sponge," read "Marine Invertebrates."

Page cxxx, line 53, for "Geo.," read "James."

Page cxxxi, line 1, for "Geo.," read "James."

Page cxxxi, line 18, for "Staveley," read "Staneley."

Page cxxxi, line 33, for "Home Hill," read "Herne Hill."

Octopus vulgaris—Mr. Arch. Gray.
Sepiola, Sp.—Mr. Arch. Gray.
36 Snails, *Helix nemoralis* (variety in banding)—Mr. James Mason.
Necrophorus vespillo—Mr James Menzies.
Lepidoptera (British), 11 species—Mr. R. Lawson.
,, 159 specimens—G. W. Kirkaldy, Esq.
Stick Insects, 2 specimens—Mrs. Atholl Macgregor.
Winged Termiti—Mrs. Atholl Macgregor.
Mantis and a number of Indian Butterflies—Mrs. Atholl Macgregor.

Sea-pen, *Pennatula phosphorea*.
Echinoderm, *Solaster papposus*.
,, *Porania pulvillus*.
,, *Asterias rubens*.
,, *Echinocardium cordatum*.
,, *Brissopsis lyrifera*.
,, *Aphrodite aculeata*.
,, *Pontobdella muricata*.
,, *Cancer pagurus*.
,, *Hyas coarctatus*.
,, *Eupagurus bernhardus*.
,, *Porcellana platycheles*.
,, *Nephrops norvegicus* (m. and f.)
,, *Munida rugosa*.
,, *Sacculina carcini*.
,, *Alcyonidium gelatinosum*.
,, *Lima hians*.
,, *Lutraria elliptica*.
,, *Patella vulgata*.
,, *Buccinum undatum* and eggs.
,, *Moschites cirrosa*.
,, *Corella parallelogramma*.
,, *Ascidia mentula*.
Sponge, *Subrites domuncula*.
} Millport, per James Coats, Esq., Jun.

Fungus, *Polyporus sulphureus*—Mr. Charles MacIntosh.
A collection of Fungi, 71 species—Miss Miles, Mr. Menzies.
Photos of Fungi, 71 species—Miss Jameson, Mr. Rodger.
A number of Rock Specimens—Mrs. Craigie Sandbach.
Sand and Gravel (ancient river deposits), Dunkeld—H. Coates, Esq.
Glen Tilt Marble—Mr. John Robertson.
A number of Old Esquimaux House Implements, etc.—Capt. Milne.
A number of Esquimaux Carved Models (Ivory)—Capt. Adams.
6 Ancient Palaeolithic Implements, Jalelo, E. Africa—H. W. Seton-Karr, Esq., M.P.

III. LIBRARY.

Montevideo, Anales del Museo Nacional de—
Fas. XVII., Tom II.
,, XVIII., ,, III.
,, XIX., ,, IV.
Fas. XX., Tom III.
,, XXI., ,, III.
,, XXII., ,, IV.
} The Museum.

North American Fauna, Nos. 16, 20, 21—U. S. Dept. of Agriculture.
British Association, Report of, 1900—The Association.

Natural History Society of Glasgow, Transactions of, Vol. VI., Part I.—The Society.

Science Gossip, March, 1901, February, 1902—H. Coates, Esq.

Scottish Geographical Magazine, 1901—H. Coates, Esq.

Wisconsin Academy of Science, Art, and Letters, Transactions of, Vol. XII., Part II., Vol. XIII., Part I.—The Society.

American Museum of Natural History, Bulletin of, Vol. XIII., 1900—The Museum.

Mexico, Boletin del Instituto Geclogico del, No. 14, 1900—The Institute.

Smithsonian Institution, Annual Report of, 1898—The Institute.

Nova Scotian Institute of Science, Proceedings and Transactions of, Vol. X., Part II.—The Institute.

North American Herpitology (Reptiles and Amphibians), 5 vols., John Edward Holbrook, M.D.—Trustees of the late Andrew Coates, Esq.

Academy of Natural Science, Philadelphia, Proceedings of, Vol. LII., Part III.; Vol. LIII., Parts I. and II.—The Academy.

Edinburgh Geological Society, Transactions of, Vol. VIII., Part I.—The Society.

Nature, Vols. LXI. and LXII.—Robert Kidston, Esq.

Geological Society, Quarterly Journal of, Nos. 226, 227, 228, 229—The Society.

Berwickshire Naturalists' Club, Proceedings of, Vol. I., reprint—George Muirhead, Esq.

Berwickshire Naturalists' Club, Proceedings of, Vol. XVII., 1899-1900—The Club.

Buchan Field Club, Transactions of, Vol. V.—The Club.

Australian Museum, Report for year 1899—Trustees.

Northamptonshire Natural History Society, Journal of, Vol. X., Nos. 81-84—The Society.

British Museum Catalogues—
Welwitsch's African Plants, Part IV.
,, ,, ,, Vol. II., Part II.
Hand List of Birds, Vol. II.
The Jurassic Flora of Yorkshire, Part I.
} The Trustees.

Geological Literature added to the Geological Society's Library, for 1900—The Society.

Royal Physical Society, Proceedings of, Vol. XIV., Part III.—The Society.

Geological Survey of the United States, Annual Reports, 1899-1900, Parts I.-VII., 1900-1901, Parts I.-VI.
Preliminary Report on Cape Nome Gold Regions.
} Survey Department, U.S.A.

American Museum of Natural History, New York City, Report, 1900—The Trustees.

Prof. Wm. Macgillivray, M.A., LL.D., Memorial Tribute to—Wm. Macgillivray, Esq., W.S.

Salmonidæ, On Stocking Rivers, Streams, Lakes, Ponds, etc., with—Howietoun Fishery Co.

Missouri Botanical Garden, 12th Report—The Trustees.

Manchester Museum Report, 1900, 1901, No. 33—The Museum.

Fishery Board of Scotland, 19th Annual Report of, Part II.—Scottish Fishery Board.

Okapi, Reprint of, from Zoological Proceedings—Dr. P. L. Sclater.

The Gardens and Menagerie, Vols. I. and II.—Mr. John MacGregor.

U. S. National Museum Annual Reports, 1896-7-8-9—The Trustees.

Lloyd Library, Bulletin of, No. 2—The Director.

Stirling Natural History Society, Transactions of, 1900-1—The Society.

Half-Hours with the Microscope, E. Lankester—Rev. Geo. Gibson, D.D.

The Romance of Natural History, P. H. Gosse—Rev. Geo. Gibson, D.D.
Nottingham Naturalists' Society, Annual Report and Transactions of, 1900-1—The Society.
Canadian Birds, Catalogue of, Part I., 1900—Geological Survey, Canada.
Manual of Injurious Insects and Methods of Prevention—G. F. Bates, Esq., B.A.
Fungi, Index to British, Cook—H. Coates, Esq.
Land and Freshwater Shells, R. Rimmer—H. Coates, Esq.
Life and Work of Dr. James Croll, Campbell-Irons—H. Coates, Esq.
Northumberland Sea Fisheries Committee, Report on the Scientific Investigations, 1901—The Editor.

ADDITIONS TO THE ROLL OF MEMBERSHIP

During Winter Session 1901-1902.

ORDINARY MEMBERS.

Brady, John C., Melville Street, ...	14th November, 1901
Brough, Miss Elizabeth, Wilson Street, ...	13th March, 1902
Carver, E. J., 12 Bath Street, Glasgow, ...	13th March, 1902
Clark, Miss Nellie, Kinnoull Public School, ...	12th December. 1901
Coats, Miss M. M., Staveley, Paisley, ...	13th March, 1902
Drummond, Miss Sybil, Megginch, ...	12th December, 1901
Drummond, The Hon. Mrs., Megginch, ...	13th March, 1902
Fairweather, John, Schoolhouse, Kinnaird, ...	13th March, 1902
Fairweather, Mrs., do. do., ...	13th March, 1902
Kaye, Thomas, Westerville, Glasgow Road, ...	13th March, 1902
Knight, Rev. G. A. F., F.L.S., St. Andrew's Manse, Auchterarder, ...	14th November, 1901
Millais, Sir John, Bart., 38 Lower Belgrave Street, Eaton Square, London, ...	13th February, 1902
Macaulay, Mrs., 3 King's Place, ...	14th November, 1901
M'Gregor, Mrs. Atholl, Ardchoille, ...	12th December, 1901
Mackenzie, Sir Alex. Muir, Bart., of Delvine, ...	14th November, 1901
Ridley, Miss, Tayside, ...	12th December, 1901
Scott, W. M., 8 Hill Street, Glasgow, ...	14th November, 1901
Smith, F. H., 23 Kestrel Avenue, Home Hill, London,	14th November, 1901
Spence, Thomas, St. Margaret's Cottage, Craigie Road,	13th March, 1902
Sym, John David, Sheriff-Substitute, Balboughty, ...	14th November, 1901
Thomson, Robert J., Kinnoull, ...	12th December, 1901
Walker, Dougald, Northern District Public School, ...	12th December, 1901
Young, Rev. D. G., B.D., Manse, Moneydie, ...	14th November, 1901

SUMMER SESSION, 1902.

THE following Excursions were arranged :—

1. Monday, 19th May.—Roman Camp, Inchtuthill. (Jointly with Antiquarian Society.)
   Conducted by Sir Alex. Muir Mackenzie, Bart.

2. Saturday, 21st June.—Banks of Earn—St. Fillans to Comrie.
   Conducted by Mr. H. Coates.

3. Saturday, 5th July.—Creag-na-Caillich, Killin.
   Conducted by Mr. P. Macnair.

4. Saturday, 12th July.—Half-Day Excursion—Invergowrie to Longforgan. (Jointly with Dundee Working Men's Field Club.)
   Conducted by Mr. Robt. Dow.

5. Saturday, 19th July.—East Bank of Tay—Caputh Bridge to Cargill.
   Conducted by Mr. Barclay.

6. Saturday, 2nd August.—Ballinluig.
   Conducted by Mr. Rodger.

7. Saturday, 16th August.—Loch Marlee.
   Conducted by Mr. Menzies.

8. Thursday, 28th August.—Clatteringwell Quarry, Bishop Hill.
   Conducted by Mr. James Paterson.

9. Saturday, 6th September.—Rumbling Bridge of Dollar. (Jointly with the Scottish Natural History Society of Edinburgh.)
   Conducted by Mr. H. Coates.

10. Saturday, 20th September.—Cryptogamic Excursion to Battleby.
    Conducted by Mr. James Menzies.

BALANCE-SHEET of THE PERTHSHIRE SOCIETY OF NATURAL SCIENCE for the Year ended 28th February, 1902.

INCOME.

Balance in Savings Bank at 28th Feb., 1901, ...	£2	16	8		
Balance in Treasurer's hands, ...	0	18	6½		
				£3	15 2½
Subscriptions and Entrance Fees, ...				99	3 0
Life Member's Subscription, ...				5	5 0
Contributions towards Coals and Gas, ...				1	16 0
Interest on Savings Bank Account, ...				0	7 1
				£110	6 3½

EXPENDITURE.

Janitor, Proportion of Salary, ...	£5	0	0	
Fire Insurance, ...	7	0	0	
Feu-Duty and Income Tax, ...	7	19	1	
Furnishings, &c., ...	4	16	9	
Coals and Gas, ...	15	4	10	
Printing, Stationery, &c., ...	31	10	9	
Books, Magazines, and Binding, ...	18	17	10	
Subscriptions to other Societies, ...	1	1	0	
Postages and Petty Outlays, ...	6	19	7½	
Balance in Savings Bank, ...	11	10	3	
Balance in Treasurer's hands, ...	0	6	2	
	£110	6	3½	

PERTH, 12th March, 1902.—We have examined the foregoing Accounts for the year, with the relative vouchers, and find them correct. The sum in Savings Bank at the close of the year is £11 10s 3d, and in Treasurer's hands 6s 2d; total £11 16s 5d.

(Signed) JAMES MORISON, WILLIAM BARCLAY, } *Auditors.*

PERTHSHIRE SOCIETY OF NATURAL SCIENCE—MUSEUM FUND.

ABSTRACT FOR YEAR ENDING FEBRUARY, 1902.

INCOME.

Balance at Credit, February, 1901, ...	£0	6	10
Subscriptions and Grants, ...	295	2	0
Collected per Box in Museum, ...	2	0	3
	£297	9	1

EXPENDITURE.

Salaries of Curator and Janitor,	£170	0	0		
Specimens and Mounting same,	51	12	11		
Boxes, Tablets, &c., ...	18	8	5		
Gas Pendants, additions to Cases, &c., and Repairs, ...	29	3	4		
Furnishings, ...	14	8	1		
Petty Outlays, ...	9	4	10		
Year's Expenditure,				£292	17 7
Balance at Credit, February, 1902, ...				4	11 6
				£297	9 1

PERTH, 12th March, 1902—Examined and found correct. (Signed) WM. BARCLAY, *Auditor.*

[This Part, pp. ciii–cxxxiv, published 1st November, 1902.]

WINTER SESSION, 1902-1903.

13th November, 1902.

HENRY COATES, F.R.S.E., President, in the Chair.

The following resolutions, proposed by the President, and seconded by Sir Robert Pullar, were unanimously agreed to, viz.:—

1. That the members of the Perthshire Society of Natural Science desire to record their sense of the loss which the Society has sustained in the death of Mr. Robert Brown, F.E., R.N., who, throughout the nineteen years during which he was a member, was a warm supporter of the Society, and took a deep interest in all that concerned its welfare.

2. That a copy of this resolution be sent to Mrs. Brown.

Sir Alexander Muir Mackenzie, Bart., exhibited a number of articles found during the excavations at the Roman Camp of Inchtuthill.

The President delivered the following Opening Address:—

LADIES AND GENTLEMEN,—We have already expressed, in the formal resolution which we have passed, our regret at the death of one who has been long and intimately associated with our Society, namely, the late Mr. Robert Brown. During the nineteen years Mr. Brown was a member of the Society, he was one of the most regular attenders at both its meetings and its excursions, and always took the warmest interest in everything that concerned its welfare. He served on the Council for several terms, and his advice was always of value. His genial presence will long be missed from our midst.

At our excursion to Delvine in May last, not only Mr. Brown was present, but also another old member, who has since passed away, namely, Mr. William Davie, of Woodbrae, Dunkeld. Mr. Davie's connection with our Society did not extend over very many years, but he was a keen observer and student of nature, and had made many interesting observations in his own part of the county. He was an excellent Archæologist and also a good Geologist. In particular, he had made a special study of the surface geology around Dunkeld. I had many interesting discussions with him regarding the origin of the River Terraces of the Tay Valley, and if he had been spared I have no doubt he would have given us a valuable paper on this subject. It would be difficult to find a more interesting and genial companion than Mr. Davie was.

THE MUSEUM.

As you are all aware, one important event has taken place since our last meeting, namely, the transference of the Museum from the Society to the Town. This is a matter for congratulation, inasmuch as it assures the maintenance of the Museum as a Public Institution for all time coming. Many of you, I am aware, have a certain feeling of regret that the Museum is now no longer the exclusive property of the Society. For all practical purposes, however, our interest in the Museum will continue to be as great as ever, and I have no doubt that the Town will always be only too pleased to accept the assistance of the Society in extending the collections. It is stipulated, too, that the Society is to retain the exclusive use of the Library and Lecture Room, so long as they shall continue to pay a rent for the same. The only stipulation which the Town Council made in accepting the gift was an eminently reasonable one, namely, that we should find the funds required for its maintenance during the first five years. Towards the amount required for this purpose I am pleased to say that Mr. Andrew Carnegie, after his recent visit to Perth, sent me a cheque for £125, being the equivalent of a subscription of £25 a year for the next five years. With like assistance from a few other friends of the Museum, in addition to the usual grants from the County Council, Town Council, School Board, Duncan Trust, and Co-operative Society, I have no doubt that the Treasurer, Mr. Morison, will have very little difficulty in raising the amount required.

SEASONAL NOTES.

The weather during the past summer has been exceptional in more than one respect, but especially in the long-continued want of sunshine. This has made many people imagine that the season has been abnormally cold and wet, but such, as will be seen from the following tables, is not altogether the case, although the temperature has been slightly below the average. The conditions, in fact, have been exactly the reverse of those which obtained during the summer of 1901, when there was an exceptional amount of sunshine, and long continuance of cloudless skies.

The mean temperatures recorded at Pitcullen during the summer six months of 1901 and 1902 were as follows:—

	1901.	*1902.*
May,	50.8° F.	45.6° F.
June,	54.1° F.	52.9° F.
July,	62.7° F.	55.3° F.
August,	59.2° F.	54.4° F.
September,	54.4° F.	52.0° F.
October,	45.1° F.	46.2° F.

The mean temperature for the summer months of 1902 was thus 51.1° F., as compared with 54.4° F. in 1901, or 3.3° F. less. The highest temperature registered was 79° F., on 30th June, and the

lowest 28° F., on 9th May. It will thus be seen that the thermometer never reached 80° F. during the whole summer. On the other hand, it frequently fell below the freezing point at night.

The rainfall for the summer months of the two years was as follows :—

	1901.	*1902.*
May,	0.65 inches.	1.91 inches.
June,	4.10 ,,	1.93 ,,
July,	1.13 ,,	2.30 ,,
August,	4.20 ,,	3.49 ,,
September,	1.84 ,,	2.19 ,,
October,	1.80 ,,	1.51 ,,

The total rainfall during the summer months of 1902 was thus 13.33 inches, as compared with 13.72 inches in 1901, or .39 inches less. The greatest rainfall in twenty-four hours was 1·49 inches on 18th August. No rain fell during the week ending 5th July.

The following table brings out in a striking manner the peculiar conditions of the past season as regards cloud and sunshine. The first column shows the number of days in each month on which the sky was entirely covered with cumulus clouds at 9 a.m. The second column shows the number of days when the sky was more than half, but not quite, obscured. The third column shows the number of days when the sky was cloudless at 9 a.m. :—

	Entirely Clouded.	*Half-Clouded.*	*Clear.*
May,	10 days.	9 days.	5 days.
June,	14 ,,	6 ,,	4 ,,
July,	11 ,,	6 ,,	4 ,,
August,	11 ,,	9 ,,	6 ,,
September,	13 ,,	4 ,,	6 ,,
October,	13 ,,	2 ,,	7 ,,

It will thus be seen that out of the 184 days of the summer, 72 were entirely clouded in the morning, and 36 were half-clouded or more, while only 32 were quite clear. In these observations no account is taken of cirrus clouds, or light haze.

In connection with these meteorological data, it is interesting to note the comparative figures of the death-rate in Perth during the corresponding period. The figures, per 1000 of the population, were as follows :—

	1901.	*1902.*
May,	16.8	20.5
June,	15.5	19.4
July,	18.2	14.2
August,	16.6	15.9
September,	13.7	13.9
October,	16.1	18.6

The mean death-rate during the summer six months of 1902 was

therefore 17·1 per 1000 of the population, as compared with 16·2 in 1901, showing, as was to be expected, a slight increase, owing, presumably, to the less favourable meteorological conditions.

As regards the effects of these weather conditions on vegetation, the most remarkable feature was the lateness of the season. This was especially noticeable in regard to flowering shrubs, which were from three to four weeks late of coming into bloom. Roses, for instance, did not come fully out until the end of July, and they continued in bloom until the beginning of November. Although late, they, in common with many other flowers, were particularly fine when they did come out. As the spring conditions were favourable, the hay crop was exceptionally good, while the root crops have also been good, owing to the abundance of moisture. The grain crops, however, have scarcely been up to the average, and have been difficult to cut, owing to the fields being badly laid in places. Fruit, as a rule, has been smaller than usual, owing to the lack of heat. Apples and pears have been rather a poor crop, and plums in many places have been almost a failure. Small fruits have been about an average crop. The fruit on many of the forest trees, however, such as the sycamore, and also on some of the conifers, has been rather abundant.

Insect life has also been affected by the weather conditions. Most winged insects, such as bees, wasps, butterflies, flies, &c., have been decidedly scarcer than usual. The green-fly, on the other hand, has been very much in evidence, not being affected by the want of sunshine.

The summer has been almost entirely free from storms, either wind or electrical. Of the former, the only gale of any violence occurred on 4th September, when the wind blew from the west, and did a considerable amount of damage to trees and shrubs. The only thunderstorm occurred on 28th August, when the disturbance, the centre of which appeared to be about five miles to the south of Perth, lasted about two hours.

I have again to express my indebtedness to Mr. John Leslie for assistance in making up the meteorological statistics.

NATURE-KNOWLEDGE.

During the past summer I had the privilege of taking part in two Conferences on the subject of Science Teaching and Nature Study in Schools. The first of these was held at Hartley College, Southampton, on 13th and 14th June; while the second took place in the Royal Botanic Gardens, London, in the last week of July. At both of these I was asked to read papers, giving an account of our experience in this direction in Perthshire, and also in connection with our Museum. At the London Meeting, a most interesting exhibition was held, giving examples of the children's work, both at home and in school, and also of specimens, models, diagrams, and other apparatus used by the teachers in class work. The discussions at this Conference were taken part in by leading educational authorities from all parts of the country, as well as from America,

and a large amount of most useful information was elicited. What was, perhaps, of still greater importance was the enthusiasm which was aroused, and the impetus which was given to this new and important branch of educational work. The Conference was under the direct patronage of the Educational Department, and amongst those who took part were the Duke of Devonshire, President of the Board of Education; Mr. Hanbury, President of the Board of Agriculture; Lord Balfour of Burleigh, Secretary for Scotland; and Lord Avebury, as well as a number of H.M. Inspectors of Schools and teachers. The results of both of these Conferences will be published in due course in the form of official reports. In conclusion, I would venture to express the hope that it may be possible, some time in the near future, to hold a similar Conference in Scotland, in order to show the Scotch Educational Authorities what can be done in the way of extending this branch of education.

THE SUMMER EXCURSIONS OF 1902.

The excursions during the past summer were, on the whole, fairly well attended, and the weather, on most occasions, was good. Owing to the lateness of the season, flowering plants were not in full bloom until after some of the earlier excursions were over. For the same reason, not many insects of note were got. Cryptogamic botany, however, received a good deal of attention, as well as geology. At several of the excursions a number of photographs were taken, but the light during the past summer was not, as a rule, very favourable, especially for instantaneous work.

The following are the reports of the excursions which have been prepared by the various leaders :—

1. May 19, to the Roman Camp at Inchtuthill, near Delvine, conducted by Sir Alexander Muir Mackenzie, Bart. A detailed account of the Roman remains, which were examined during this excursion, has already been published in the recently-issued Part of our *Transactions* in the form of a Field Lecture by Sir Alexander Muir Mackenzie. The following summary of the proceedings has been prepared by Mr. Barclay :—

A numerous party of ladies and gentlemen proceeded on this day to Delvine. Some went by train to Murthly and thence walked, some drove all the way from Perth, and others went on bicycles, those of the latter who went by Stanley and Murthly finding it rather a stiff task to drive against the fierce wind that was blowing. At Delvine they were met by Sir Alexander Muir Mackenzie, who had kindly come to act as guide to the party. Going first to the Camp, they inspected the excavations lately made, which had disclosed the remains of a Roman bath, the oven and flues for heating being plainly visible. Here Sir Alexander gave a short lecture on the whole subject, a summary of which will be found in the newly-published Part of the Society's *Transactions*, along with several interesting plates illustrative of the ground.* It may be mentioned

* See *Trans.*, p. 190.

also that those who wish for a more complete account will find it in a book, entitled "Delvine and the Romans," by Sir Alexander Muir Mackenzie, which is just on the eve of publication.* The party then walked along the Inch to the Fort, getting on the way a good idea of the singular nature of the Inch, or peninsula (formerly an island), on which they were treading, and which is about 60 feet above the encircling plain. At the Fort they saw the five ramparts, with their ditches, which encircle the whole, and also the foundation of an ancient Pictish house, which had been laid bare by excavation. After the President had returned thanks to Sir Alexander for his kindness, the party dispersed, each section returning to Perth by the same method as that by which it had come.

2. June 21, to the Banks of the Earn, from St. Fillans to Comrie, conducted by myself. This was the first visit which the Society had paid to this district since the opening of the railway to St. Fillans. The views of the Earn Valley from the train between Crieff and St. Fillans were much admired. Several interesting cuttings were also observed through the sandstone, conglomerate, volcanic rocks, and schists. On arriving at St. Fillans, the first point visited was the east end of Loch Earn, where several interesting plants were observed in the marshy ground near the source of the Earn. Amongst these was *Carex vesicaria*, Lin., a rather local sedge. The party then walked down the banks of the river, first on the south side, and afterwards on the north side, as far as Comrie. Several interesting plants were observed, including *Polygonum Bistorta*, Lin., which was found naturalised on the banks of the river at two places. The woods were blue with the wild hyacinth, and *Geranium sylvaticum*, Lin., and other wild flowers of the season were in full glory. The Cryptogamic members were rewarded by the find of a bright golden-coloured fungus, *Mitrula paludosa*, Fr., which was growing on dead leaves on a moist bank.

The day was particularly fine, and after a delightful ramble, the party had tea together at Comrie before returning by train to Perth in the evening.

3. July 6, to Creag-na Caillich, Killin, conducted by Mr. P. Macnair, of the Glasgow Museums. Arriving at Loch Tay about eleven o'clock in the morning, the party proceeded, in the first instance, to examine the fine section of the Loch Tay limestone, and its associated hornblende schists, exposed in the neighbourhood of Finlarig. The particularly interesting section of the Loch Tay limestone exposed on the high road between Killin and Kenmore, and described in Mr. Macnair's paper in the *Transactions*,† was also examined. After this, a start was made for the summit of Creag-na-Caillich, the various schist zones which enter into the geological structure of the mountain being noted in the course of the ascent. The summit of the mountain was reached about three o'clock. As

* This book has since been published, and a copy has been presented to the Society's library.

† See *Trans.*, p. 155.

the geological features seen in the course of the day have been described in some detail in the paper already referred to, it is unnecessary that any further details should be entered into here.

4. July 12, to Invergowrie and Longforgan. This excursion was to have been a half-day one, jointly with the Dundee Working Men's Field Club, under the leadership of Mr. R. Dow, but unfortunately the day was so wet that no field work could be done.

5. July 19, to the East Bank of the Tay, from Caputh Bridge to Cargill. The leader chosen for this excursion was Mr. Barclay, but unfortunately he was not able to be present, and Miss M. L. Miles has kindly supplied the following notes :—

The day was very fine, and the whole bank of the river was gay with the commoner wild flowers, *Origanum vulgare*, L., and *Filago germanica*, L., being particularly abundant in places. Near Delvine, where the bank of the river seems composed entirely of sand, covered only with short grass, and where sheep are allowed to graze, *Bovista plumbea*, P., one of the puff-balls, was found growing gregariously. The peculiarity of the Bovista is that the bark always shells off. This grazing ground was also remarkable for its numerous tiny sand-hills, entirely clothed by *Hypnum patientiæ*, Lindb., a yellowish-green shining moss, the roots of which apparently hold the sand together. This is a rather local moss, and somewhat resembles the more robust forms of *H. cupressiforme*, Lin.

Towards the end of the walk, the route followed led through the ground of Meikleour House as far as Kinclaven Ferry, where the main road was taken across the Bridge of Isla to Cargill station.

6. August 2, to Ballinluig, conducted by Mr. Rodger. Journeying by rail to Pitlochry, the Botanical Section of the party walked to Ballinluig, down the right bank of the Tummel. Though rain showers were seen at no great distance, only a few drops fell on the ground traversed. Although there was a rich vegetation, with plenty of species, nothing new was discovered.

The Entomological Section of the party walked over the hill to Lochan-na-Moine Mhor, and thence descended to Tullypowrie. In consequence of the weather being unfavourable, insects were scarce, and not a single dragon-fly was seen. A nest of the black ant, however, was found, and a few examples of the insect taken.

The two sections re-united at Logierait, and after partaking of tea in the Logierait Hotel, the party walked down to Ballinluig, and thence returned by train to Perth.

7. August 16, to Loch Marlee, conducted by Mr. Menzies. This excursion was brought to a premature end by heavy rain. The party reached Loch Marlee, and spent a short time on the water, dredging for pond-weeds, but were forced to give up the attempt by the heavy persistent rain which then set in. Only a very few of the numerous water plants of Loch Marlee were obtained.

A melancholy interest attaches to this excursion, as it was the last one which Mr. R. Brown attended, his death occurring shortly

after. Very many were the excursions which Mr. Brown attended, and his genial companionship was always a source of pleasure to those who were with him.

8. August 28, to Clatteringwell Quarry, Bishop Hill, conducted by Mr. James Patterson. Mr. Patterson reports as follows :—

The party left Perth by the morning train to Mawcarse, where they were joined by some members who had cycled, and who made up the party to fourteen, eleven gentlemen and three ladies. From Mawcarse we took a bee-line to the top of the Bishop Hill, a spur of the Lomonds, striking off by an old road to Glen-Vale, and then by a cart road to the foot of Balgedie Hill, which we climbed by a zig-zag footpath. At the top is an outcrop of black igneous rock, and in one place a tall column has been left standing alone, and is known locally as "Carline Maggie." One of the ladies took a photograph of this rock. From this it is only a short distance to the Quarry, which is now disused. The limestone used to be quarried, and then rolled down a gully in the hillside, at the base of which it was burned in the kilns. The limestone is very fossiliferous, and the members were soon busy with hammer and chisel dislodging the encrinites from the limestone blocks. There was nothing of special interest in the botany of the hill, except perhaps some fine specimens of the Mare's Tail, *Hippuris vulgaris*, which were found growing in a part in the Quarry. Laden with bags of stones, the party made their way down the hill to the village of Kinnesswood, which lies on a slope overlooking Loch Leven. Here they visited the house in which was born Michael Bruce, the poet, the author of the "Ode to the Cuckoo," and several well-known Scripture Paraphrases, and who died at the early age of twenty-one.

After having tea in the hotel at Kinnesswood, the party walked along to Mawcarse, where they got the evening train to Perth.

9. September 6th, to the Rumbling Bridge. This excursion was made the occasion of the annual re-union between our Society and The Scottish Natural History Society. At these gatherings, our friends from Edinburgh have generally been in the majority, but on the present occasion the reverse was the case. The valley of the Devon, from the Rumbling Bridge to the Cauldron Linn, presents some of the most romantic bits of river scenery to be found in Scotland, and always well repays a visit, whether by the artist, the photographer, the geologist, or the botanist.

Before proceeding so far, however, a halt was made at Kinross Junction, where we met the friends from Edinburgh, and afterwards walked to Loch Leven. The Canadian pond-weed, *Elodea canadensis*, Michx, which is choking up the loch, and spoiling the fishing by preventing the pike from being kept within bounds, was particularly noted by the botanists. A hurried visit was also paid to the island on which are the picturesque ruins of Loch Leven Castle.

Resuming the journey by train, the next halt was made at Rumbling Bridge, where we were met by a further contingent who had come by cycle from Perth. The whole party then made their

way down the left bank of the river, as far as the Cauldron Linn, greatly admiring the varied scenery in passing—first the precipitous gorge at the Bridge, next the steep wooded and fern-clad banks, then the comparatively placid reaches of the stream, between meadows and patches of wooding, and, lastly, the wonderful rock structures of the Linn itself. Many interesting plants were observed, and the fungologists especially were kept busy in the moist woods on the banks of the river. At the Cauldron Linn the geological structure of this wonderful gorge was examined. A dyke of hard volcanic rock traverses the softer sandstone obliquely to the line of the stream, and forms a barrier which has with difficulty been cut through by the force of the water. Several gigantic pot-holes have been formed at this point. A little further up the stream the edges of the uptilted strata of the sandstone were seen in the bed of the river.

Returning up the stream again, the magnificent crags below the Rumbling Bridge, and the rocks at the Devil's Mill, were examined. Several photographs were taken, but unfortunately the light was far far from good. After tea at the Rumbling Bridge Hotel, the several sections returned to Edinburgh and Perth.

10. September 20, Cryptogamic excursion to Battleby, conducted by Mr. James Menzies.

By the kind permission of Mr. Archibald Coats, the Society was able to hold a fungus foray in the grounds of Battleby. The party, which was a large one, travelled from Perth to Luncarty by the morning train.

The woods around the mansion-house were first searched, and fungi proved very abundant under the pine trees, ranging in size from large specimens of *Agaricus nebularis*, Batsch., a foot across, to a tiny *Marasmius*, scarcely larger than a pinhead. *A. inversus*, Scop., *A. appendiculatus*, Bull, and *A. purus*, Pers., were particularly fine, and some enormous specimens of one of the parasol mushrooms, *A. rachodes*, Vittad., were much admired. The universal veil in this species breaks up into broad concentric scales in a beautiful manner. A single plant of *Clavaria abietina*, Schum., was also found here.

Before leaving this part of the estate, the fishing loch, constructed on the Shochie, was visited, and also the gardens, where a choice collection of herbaceous plants proved very interesting.

The party then made their way to the plantation, on the left of the public road. Here the wood consists of oaks and birches, interspersed with a few beeches and Scots firs, and the character of the fungi proved altogether different from that of those found in the pine wood. *Cantharellus cibarius*, Fr., and *Russula fellea*, Fr., occurred in great troops, and were the predominant species, while on some prostrate oak branches *Calocera cornea*, Fr., was found growing.

During the day a number of *Myxomycetes* were secured by one of the party specially interested in those obscure fungi.

Although the district was unproductive of anything very rare, the day's experience could hardly be considered conclusive of the nature of the fungi of the locality, as the season, having been deficient in both heat and moisture, was quite adverse to the growth of fungi, and

a number of the commonest species have this year hardly made an appearance.

The following papers were read :—

1. "A Visit to the Outer Hebrides in search of Mollusca." By the Rev. G. A. Frank Knight, M.A., F.R.S.E., Auchterarder. (See *Transactions*, Vol. III., Part V., page 193.) The paper was illustrated by a series of lantern slides.

2. "A Visit to the Basque Country." By Sir Alexander Muir Mackenzie, Bart., of Delvine. The paper was illustrated by a series of lantern slides.

11th December, 1902.

HENRY COATES, F.R.S.E., President, in the Chair.

The following papers were read :—

1. "A Ramble on the Moor at Blair-Atholl." By Miss Mary L. Miles, L.L.A. (See *Transactions*, Vol. III., Part V., page 217.)

2. "The Bacteria, or Schizomycetes, and their place in the Natural System." By John Lyell, M.D. (See *Transactions*, Vol. III., Part V., page 223.)

8th January, 1903.

HENRY COATES, F.R.S.E., President, in the Chair.

Mr. Barclay made an appeal on behalf of Mr. John Knox, of Forfar, for subscriptions to aid in erecting a monument over the grave of George Don, the Forfar botanist.

The following papers were read :—

1. "The Microscope in Nature Study." By George F. Bates, B.A.

2. "The Sculptured Celtic Crosses of the Carse of Gowrie." By Robert Dow, Longforgan. The paper was illustrated by a series of diagrams and lantern slides.

12th February, 1903.

Mr. JAMES COATES in the Chair.

The following paper was read :—

1. "The Plants of the Carboniferous Formation. Part I.—The Ferns, Calamites, and Sphenophylls." By Robert Kidston, F.R.S., F.G.S., Stirling. The paper was illustrated by a series of lantern slides.

12th March, 1903.

THIRTY-SIXTH ANNUAL MEETING.

HENRY COATES, F.R.S.E., President, in the Chair.

The following Reports were read and adopted :—

REPORT OF COUNCIL.

The Council have great pleasure in presenting this their Thirty-Sixth Annual Report.

Five Monthly Meetings were held during the past year, at which 7 papers were read, exclusive of the usual two Addresses of the President, the one at the Annual Meeting, and the other at the opening of the Winter Session.

The Meetings continue to be very well attended, the average attendance being 47. The largest number present at a Meeting was 70, on the 12th March, 1902, and the smallest 38, on 11th December, 1902.

The Roll of Members remains almost stationary, for although 21 Ordinary Members have been added during the year, the names of 22 have been removed from the list, owing to death and other causes, showing a decrease of 1 compared with last year.

The total Membership is now 417, including 1 Honorary, 12 Corresponding, and 12 Associate Members, 8 Associates, and 384 Ordinary Members.

During the year 10 Excursions were held, and were fairly well attended. The Society was again delighted to renew its friendship with the Members of the Scottish Natural History Society of Edinburgh at an Excursion to the Rumbling Bridge on 6th September.

Your Council desire to acknowledge their indebtedness to various gentlemen who granted permission for some of the Excursions, and also to all who contributed to their success.

Last summer the Town Council again took into consideration the offer which the Society made in 1896 to present their Museum to the City, and after having conferred with your Council, they unanimously resolved to accept the gift. Your Council, at the same time, volunteered to provide the funds necessary for the upkeep of the Museum during the first five years. The Deeds of Transfer were signed on 16th June, and thereafter Sir Robert Pullar, on behalf of the Trustees, formally handed over the keys of the building to Lord Provost Love, as representing the Civic Authority. The Society, however, retains the exclusive use of the Library and Lecture Room, on payment of a rent, to be mutually arranged.

Among those removed by death during the year, your Council desire to mention especially Mr. Robert Brown, F.E., R.N., who long served the Society on the Council, and always took a deep interest in its work.

The Council are pleased to think that the Essay Competition amongst the children attending the Schools of Perthshire continues to be attractive, 100 Essays being sent in to last year's competition.

Another has been arranged for this year, the subject being "The part which Water has played in the breaking down and building up of the Rocks of Perthshire."

The Council have been pleased, as formerly, to allow the Lecture Room to be used by other Societies for Meetings.

REPORT OF TREASURER.

(See Balance-Sheet, page clvii.)

REPORT OF TREASURER TO THE MUSEUM FUND.

(See Balance-Sheet, page clviii.)

REPORT OF LIBRARIAN.

It is satisfactory to be able to report that a good appreciation of the advantages of the Library continues to be shown by the Members of the Society. But further its value has been proved by the numbers who have utilised it for consultation purposes, such as teachers attending the Saturday classes, and school children eager to acquire facts bearing upon their essay competition. These remarks apply both to the Lending and Reference Departments. Borrowed books number 222. During the year 40 volumes have been added to the Lending Library, and 29 to the Reference—in all 69 volumes, so that the Council cannot be reproached with failure to keep pace with the times.

Since last Report, the arduous and important task of constructing a new catalogue, embracing all books to the present date, has been undertaken. This work has now reached an advanced stage, and it is hoped that it will very soon be in the hands of the Members.

REPORT OF EDITOR.

The Fourth Part of Vol. III., New Series, of the *Transactions and Proceedings* of the Society has been published and issued to Members during the year. Copies of the Society's *Transactions and Proceedings* have been sent to 41 Institutions (British and Foreign), and in exchange many valuable additions to the Library have been received.

The following office-bearers were elected:—

President—Henry Coates, F.R.S.E.
Vice-Presidents—Miss M. Thomas, L.L.A.; Miss Macnab, L.L.A.; R. D. Pullar, F.C.S., R. Lawson.
Secretary—S. T. Ellison.
Treasurer—Alfred Brown.
Librarian—James Coates.
Editor—William Barclay.
Councillors—Atholl MacGregor, James Stewart, L.D.S., G. F. Bates, B.A., John Lyell, M.D.
Curator—A. M. Rodger.
Treasurer of Museum Fund—James Morison.

The President then delivered the following Address :—

THE MUSEUM.

Ladies and Gentlemen,—You have heard from the Report of the Council that the Museum which we, as a Society, have been organising during the past quarter of a century, has been finally handed over to the custody of the Municipal Authority, in trust for the citizens, in all time coming. It must, I am sure, be a matter of rejoicing to know that the future prosperity of an Institution, which is so dear to all of us, is assured, and that when its present supporters shall have passed away, it will not suffer loss. I think also that we have given sufficient evidence of the unselfishness of our aims in volunteering to bear the whole burden of its maintenance during the first five years of its municipal career.

I should like to take this opportunity of pointing out very emphatically that the Society has in no sense relieved itself of a financial burden in handing over the Museum. In the past, the whole amount required for the Museum, amounting to about £300 a year, has been specially raised for that purpose, while the whole of the ordinary income of the Society, amounting to about £100 a year, has been devoted to the ordinary requirements of the Society, apart from the maintenance of the Museum. In future the same will hold good, so I trust no one will think that his or her support will be less welcomed now than it was formerly. Indeed, if we are to carry on our educational and scientific work as actively as ever, I hope that we may see a large accession to our membership.

Our interest in the Museum, however, must not be confined to its financial prosperity. We must bear in mind that it is the Perthshire Natural History Museum, and its new governing authority will look to us for assistance in maintaining the high scientific and educational reputation which it has acquired. Even our own credit, as its founders, demands that we should not relax our efforts to make its collections as complete, as attractive, and as educational as they can be made. There is still much to be done in the way of thoroughly investigating all departments of animate and inanimate nature in the Basin of the Tay, and it is our function to bring the fruit of these investigations, laborious and long continued as they may be, to the Museum. The Town Council has paid us the compliment of electing seven of our number to act as the Joint Committee of Management, and they have expressed the hope, which I know will not be a vain one, that the members of this Society will continue to assist the Management and the Curator in the technical branches of the work.

I have dwelt on this phase of the changed order of things at some length, because I have been apprehensive that some of our Members might imagine that the *raison d'etre* of our Society had been somewhat impaired when the Museum passed out of its possession. I trust, however, I have made it clear that this is very far from being the case, and that there is as abundant scope for the

exercise of our energy and enthusiasm as ever. Indeed, the chief difference is that henceforth we are to have the pleasure of paying a rent for our Rooms!

THE DUNFERMLINE NATURALISTS' SOCIETY.

It is with much satisfaction that we have to congratulate a neighbouring town and county on having, within the last few months, added another name to the roll of Scottish Natural History Societies, namely, the Dunfermline and West of Fife Naturalists' Society. The originators of that Society did us the honour to invite delegates from our Society to their Inaugural Meeting, and to their opening Conversazione; and they have paid us the further compliment of founding their constitution largely upon ours. Not only so, but they have expressed a laudable ambition to establish a Regional Museum, which shall rival or excel the Perthshire Natural History Museum! In this exalted aim, I am sure that we wish them the heartiest success. They have already enrolled a membership of nearly 300, and one of the most promising features of their efforts is that this number embraces a large number of the teachers of the district, and even some of the pupils in the advanced departments of the schools. This is an example which, I trust, some of our Perthshire Essay Prize-Winners will note and follow.

SEASONAL NOTES.

The meteorological conditions during the past season have been almost phenomenal as regards rainfall and wind storms. During the fourteen weeks, from 1st December, 1902, to 7th March, 1903, constituting the winter quarter of the year, 15.99 inches of rain fell at Pitcullen, representing just about one-half of the normal rainfall for twelve months. This long-continued excess of rainfall, accompanied by persistent westerly winds, caused the Perthshire rivers to come down in spates, exceeding those experienced for a great many years. The Tay, in particular, from Logierait to Dalguise, broke through its barrier at many points, washing away vast quantities of material in some places, and piling up new deposits of sand and gravel in others, thus giving a vivid geological lesson on what a river can do in a short space of time when left to its own devices, untramelled by those of man. The lower haughlands were all completely covered, and in many cases the higher haughlands also. At Perth, the Inches and the lower parts of the town were flooded on Friday and Saturday, 30th and 31st January, 1903, and again, but to a less extent, on Monday, 9th February. Mr. Davidson, the Water Manager, informs me that on these dates the water at the Railway Bridge stood at the following heights:—

January 30,—14 ft. 3 in.
,, 31,—14 ft. 6 in.
February 9,—12 ft. 1 in.

The mean summer level of the water at that point is 2 feet, so that

amount has to be deducted from the above figures to show the excess. The highest previous flood in recent years was on 7th February, 1894, when exactly the same height was registered—namely, 14 ft. 6 in.

During the week preceding the flood, namely, from 25th to 31st January, westerly gales of extraordinary violence and continuance were experienced, which tended to force the water out of Loch Tay. On Friday, 27th February, the windstorm, which did so much damage in the South and West of Scotland, was not felt with the same severity in Perthshire. On that date, however, the barometer at Pitcullen fell to 28·344 inches, which is the lowest recorded for some years. The lowest temperature recorded during the season was 11 deg. F., on 14th and 15th January, representing 21 degrees of frost, but there were no long-continued spells of frost.

THE CHILDREN'S ESSAY COMPETITION.

Another session of the Children's Essay Competition has been successfully completed, the prizes having been distributed last week. Perhaps the most gratifying feature of the latter function was the remark made by Mr. Smith, His Majesty's Inspector of Schools, that Perthshire held the lead amongst Scottish counties in regard to nature knowledge. This, I think, is a testimony, not only to the work of our Society during the last three decades, but also to the intelligence of both the teachers and scholars of the county. How well would such a testimony have gratified our founder, Dr. Buchanan White, had he been spared to hear it, for the encouragement of a love of Natural History amongst the young was an object that lay very near to his heart.

I shall content myself with quotations from just two of the Essays, one from the town and the other from the country. From these extracts I think you will see that the children have not derived all their information from books or from the Museum labels, but have drawn some of their inspiration from the sun-lit fields and the mossy woods.

One girl, 12 years of age, in the Southern District School, describes the habits of the "Daddy-long-legs" as follows:—"The Daddy-long-legs does not look like an insect that could do much harm. It has no jaws with which to eat our crops, neither does it bite us like the gnat, or sting us like the bee. It seems quite harmless, and few would think that it was a very mischievous insect. But then we forget it has not always been a Daddy-long-legs. For a long time it was a grub, living under the ground, and feeding upon the roots of grass and corn. Often when these flies are young they do so much harm, that sometimes they will destroy a great part of the corn in a field. If we see a patch of grass in a field lying dead and withered, we may be sure that a Daddy-long-legs grub is lying hidden below. Sometimes farmers call this grub the 'Leather-jacket,' because its skin is so very tough and strong. Its skin is of a dirty white colour, and is so wrinkled that it looks as if its skin were too big for it. When this grub is fully grown, it is not very long,

sometimes only an inch or an inch and a half. It has a pair of strong jaws, which are very well suited for cutting through the roots of corn and grass. In summer it is a very interesting sight to see the female laying her eggs. First, she walks about over the grass until she has found a place where the ground is soft. Then she stands almost upright on her long hind legs, and begins to bore a hole with the sharp spike at the end of her body, turning it from side to side. When she has made a deep enough hole, she lays an egg in it, and then goes a little way further and bores another hole, and lays an egg in it, and so on until she has layed all her eggs."

A boy of 14, living in the beautiful little hamlet of Inver, at the mouth of the Braan, begins his Essay as follows :—"There are many species of insects in Perthshire, and, if we live in the country, we have a good opportunity of studying their life-history. We find an insect of some description wherever we may roam, if we look for them. Some people do not know where to look for them. If I was looking for a beetle, I would look under a stone or in a mossy place. Some boys who live in large towns, such as London or Liverpool, never have the chance of studying Nature."

Proceeding to speak of the habits of the ant, he gives the results of his observations as follows :—"A very common insect in this district is the ant. One Saturday I saw, on Craig-vinian Hill, a very large ants' heap, about four feet high, made of the withered sharp-pointed leaves of the spruce tree. I put a piece of bread on to the heap, and in about a minute it was eaten. I also got a stick, and gave the heap a turn over, and I saw an innumerable lot of eggs, which the ants began to carry away with their hind legs."

SCIENCE CLASSES AT THE MUSEUM.

Before concluding my introductory remarks, I wish merely to refer to the educational work which has been carried on by our Curator, Mr. Rodger, during the past winter. Two most successful courses of lectures and demonstrations on "Animal Life" have been conducted in our Lecture Room—the one, on Saturday mornings, to teachers from all parts of the county; and the other, on Saturday evenings, to working men. The former, which was one of the courses under the auspices of the Technical Education Committee of the County Council, was illustrated not only by specimens from the Museum, but also by a large number of living specimens obtained from the Milport Marine Station and elsewhere. Such courses of instruction cannot fail to spread an interest in Natural History studies throughout the county.

GEOLOGICAL LESSONS FROM THE GRAND CAÑON OF THE COLORADO.

When I attended the class of Geology in Edinburgh University, in 1880, Professor Archibald Geikie, who had then just returned from the Western States of America, chose as the subject of his opening address the Grand Cañon of the Colorado. He said that the vision of that unique gorge had given him a new revelation of

geology, and he advised his students, if they ever had an opportunity of doing so, to visit the region for themselves. Twenty-two years later, namely, in the spring of 1902, having occasion to be in America, I remembered and followed his advice, and found that his description, instead of being exaggerated, failed to give an adequate idea of the reality. Indeed, no verbal description can convey a true impression of this wonderful region.

The River Colorado, with its tributaries, the Grand and the Green Rivers, drains the great plateau region of Western America lying between the Rocky Mountains and the Wahsatch Mountains. This region occupies an area of 240,000 square miles, and embraces the greater portion of the States of Wyoming, Utah, Colorado, Arizona, and New Mexico. It drains into the Pacific Ocean, at the northern extremity of the Gulf of California. It derives its name of Colorado (Spanish, "Red") from the prevailing colour of the rocks through which it flows. The most remarkable portion of its course, however, is found in the last 250 miles, where it cuts through the great Colorado Plateau, in the State of Arizona. This plateau consists of an arid table-land, elevated some 7000 feet above sea-level, and built up of nearly horizontal strata of Sedimentary rocks. Through this mass of level strata the river has, through the course of long ages, cut its way to a depth of about 6000 feet, forming a gorge, or rather a succession of gorges, whose sides rise in a series of cliffs and terraces. Owing to the dryness of the climate these walls of the Cañon do not get bevelled off in slopes of easy gradient, as do the sides of valleys in a more humid climate. The result, from a scenic point of view, as can easily be imagined, is grand in the extreme. In some places stupendous walls of rock rise sheer up to the height of 1000 or 1500 feet, while in other places they get broken up into pinnacles and spires and domes of every conceivable shape. One of the most striking features of the scene is the variety of colouring of the rocks, which extends through every gradation of red, purple, yellow, and orange, and from black to white. The formations exposed in this gigantic geological section extend from the primeval Gneiss at the bottom of the cleft right up through all the Palæozoic rocks, as far as the Permian formation. The interest of the scene to a geologist is twofold, for, in no other region can the effects of denudation be seen on such a gigantic scale, and in no other spot can so many of the geological formations be seen exposed in one section.

Sir Archibald Geikie, in his Text Book of Geology, gives the thickness of the various strata represented in the Cañon as follows :—

		Thickness.
Permo-Carboniferous.	8. Bellerophon Beds, - - -	250 feet.
Coal-measures.	7. Cherty Limestone, - - -	350 ,,
	6. Cross-bedded Sandstone, - -	200 ,,
	5. Aubray Red Shales, &c., - -	1200 ,,
Lower Carboniferous.	4. Red Wall, - - - -	2500 ,,
	3. Tonto Group, - - - -	300 ,,
	2. Silurian Rocks, - - -	300 ,,
	1. Granite, Schist, &c., - -	1200 ,,
	Total, - - - -	6300 ,,

The chief lesson for us, it seems to me, in studying the geology of the Grand Cañon, is that it enables us to realise the enormous amount of denudation which must have taken place in our own country, where one formation rests unconformably on another, and where the present rocks represent only the small ruins of former vast extents of sedimentary deposits.

APPENDIX—NOTES ON DAMAGE CAUSED BY FLOODING IN THE TAY VALLEY IN JANUARY, 1903, BY JOHN S. GRANT, BALLINLUIG.—Three attending circumstances or conditions account for the extraordinary flooding on 31st January, 1903. (1) Exceptional rainfall; (2) rapid thaw, after heavy snowfall on the hills; and (3) fierce and continued gales from the west and south-west. Specially in regard to Loch Tay is this the case, for its long winding, comparatively narrow shape, lends itself to the terrific wind storms that literally blow the overflowing Loch to the Kenmore end. Both Glen Dochart and Glen Lochay, at the Killin end, are narrower and steep, and here, as well as along the Loch sides, the hill streams bring down their torrents of melted snow. The wide valley, to the west of Aberfeldy, is the first tract of arable land where the swollen river takes possession. No embankments are sufficient to confine the stream, and even ordinary flooding causes stoppage of traffic towards Weem, because the levels of the haugh lands are below that of the flooded and confined river; but the actual rise of water, as seen in the submerging of fences, walls, hedges, and roadways, until boats could be sailed from side to side of the valley, can hardly be believed. Were it not that the stream is sluggish, and the fall gradual, the general damages in this part would be more serious and apparent. No doubt much of the soil is washed away, and deposits of sand left instead; but there do not appear to be the same tremendous bursts, with mountains of gravel, stones, and sand thrown out on the fields as lower down the Tay Valley, or along the shorter course of the Tummel. This submerging of the entire valley is again seen from the haughs below Pitnacree, to the narrows, just at Logierait Bridge and Ferry. On this occasion, even the Ballechin banks have suffered little, though for two months the floods have not decreased to allow the arable land to be seen.

The Tummel, in its rapid course from the Loch to below Pitlochry, is so much confined, running as it does in a rocky gorge, that embankments are not required; but when the Dunfallandy haughs open out, there the floods at once take possession, and make a straight course to the sea, over and through every obstruction, the natural channel of ordinary use being quite obliterated. Just below Tomdachoill, on the south bank, the first break occurs. Of this one we have not yet taken a photo. A little lower down, on the Moulinearn side, are two wide gaps. (Plate I.) This view shows the new channel forced by the flood first over, then through the strong embankment. One end of the gap is seen, with pool and gravel, stones and soil washed right out on fields. There is another gap a little further down, but the excavation here, and deep pool left, with the silting of material, and end of damaged embankment, form a striking example of the extraordinary force of the flooded stream. A little below Moulinearn, on the opposite side, can be seen another gap and displacement of the strongly-built retaining walls. About 40 yards are torn away, and will meantime result in fields getting out of cultivation, being now covered with deposits of gravel and stones, with a washing away of arable soil. The embanking and confining the river below Moulinearn has cost His Grace the Duke of Atholl immense sums in the past, and were it not for the

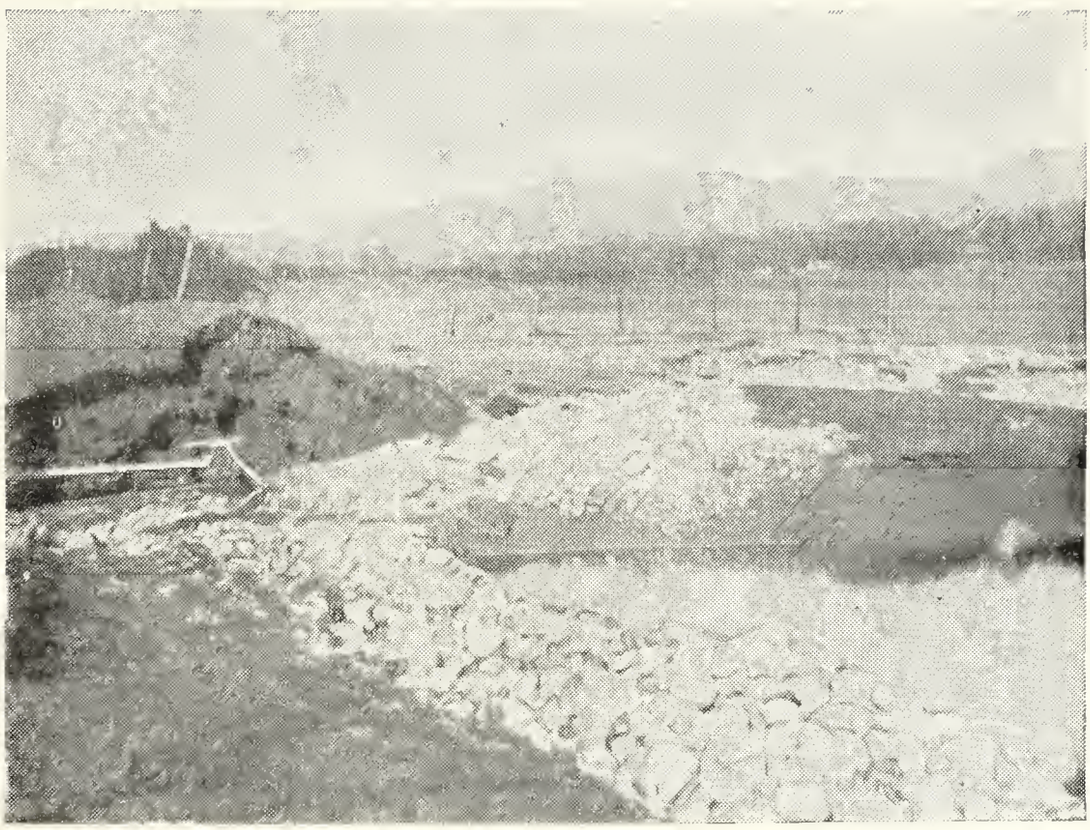


Plate 1.—Break on left bank of Tummel above Moulinearn.

Plate 2.—Flooded Haughland below junction of Tay and Tummel, showing broken embankment.

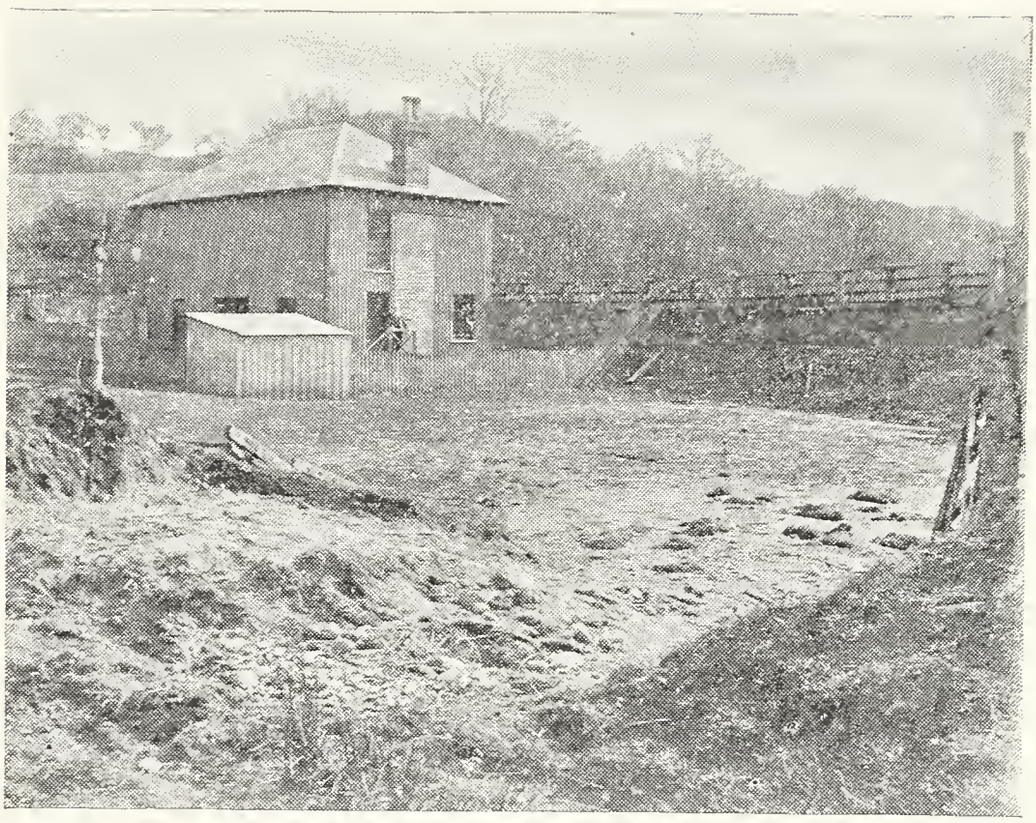


Plate 3.—Store at Guay, showing broken embankment in foreground and field covered with silt and shingle.

Plate 4.—North end of broken embankment on right bank of Tay below Dalguise Bridge.

fear of heavier flooding and more serious damages further down, the great outlay again required to repair and replace river banks and protection walls would naturally cause some hesitation. Between Tynreich and Inch Farm the banks have stood well; but at a critical turn on Haugh of Tullymet Farm, where, in an extra overflow, a strong stream is carried over the island in front, about 40 yards of a gap has been made. (Plate 2.) Our photograph shows both ends of the opening, the pool left, of large size, where embankment stood, with the newly turned up soil behind, over acres of which piles of stones and gravel now lie. Here a considerable part can hardly be cropped this season. At the opposite side of the field the rush of water and débris has actually entirely uprooted a bush and thorn hedge, with wire fence. Not a trace of hedge is to be seen, and the iron standards and straining part of the fence, though embedded in heavy blocks of stone, are turned over and displaced like matchwood. Of course there was the combined force of the Tay and Tummel, as this part is a little below the junction. On the south side, below Balmacneill House there is a tremendous gap made at a spot that has not formerly given way. Here heavy silting and excavation have been caused, many acres of arable fields requiring extensive clearing. Near Kindallochan, on the north side, is seen a remarkable break, where even the thick row of alders along the river side has not afforded sufficient protection against the flood, and consequently the embankment is entirely gone for a length of over 30 yards. Just here is Guay Island, seldom entirely covered, but on this occasion the Shetland ponies grazing there ran a very narrow risk, as they were to the neck in water, and swimming about in a pool, while a few were washed away. Nearer Guay is seen the beginning of a washed-away embankment; in front is the edge of shingle at river side; and when the water had forced its way by mole-holes or water-rat workings, in a few minutes sods of grass were torn off, and the soil beneath quickly got washed away. When this and the previous gap gave way, there was a deep submerging of the fields, roadway, farm house, and buildings at Guay, and so suddenly did the rush come down that cattle and horses were standing deep in water in their stalls. The sudden rush carried away the banks of the Guay Burn, causing a damaging flooding in the Store at Guay (Plate 3), where a tailor, while engaged in removing goods, found himself in a muddy stream to the middle, and had to be rescued. The height to which the water rose here above floor level was 30½ inches; while the second high flood, on 22nd February, showed a rise of 11 inches less. Dowally Farm escaped with flooding, mostly backwater, which left an extraordinary amount of débris, including large numbers of drowned rabbits.

On the Dalguise side, just below the Railway Bridge, there is a tremendous gap (Plate 4) of over 100 yards, and terrible destruction was wrought. At this point there is a bend in the river course both above the bridge, where bursts have been frequent, and below. There was tremendous weight and pressure on the embankment, and when the raging floods commenced to wash over, there was a rapid break away, and a tearing up of strong retaining walls; trees were uprooted and carried away in a confused heap (Plate 5). On the large tree on the left can be noticed the flood record mark, at a height almost incredible. The next view (Plate 6) shows the damage along the side of the river to the other end of this gap. In front are seen the broken retaining walls, and behind, instead of the embankments, pools of great depth, and a displacement of gravel and soil over the grass fields that is extraordinary. A few hundred yards lower, the embankments are again washed away, leaving considerable gaps. At Dalmarnock is another break, a place that seldom escapes, though a long distance from the regular river channel. The surface here is, however, at a low level right across the Dalguise Valley down to Inchmagrannachan, and the water, even in an ordinary flood, rises high on the railway embankment. From this point the valley narrows to a pass, and till below

Dunkeld there is not the expanse of country so liable to floods and consequent damaging effects. As to records, opinions differ, but the Tay on this occasion would appear to have almost reached the very highest point.*

9th April, 1903.

HENRY COATES, F.R.S.E., President, in the Chair.

Mr. John Ritchie, LL.B., exhibited a Diagram, constructed by himself, showing the various peaks to be seen from a point on Corsiehill. (See *Transactions*, Vol. III., Part V., page 245.)

The following papers were read :—

1. "Our Smallest Birds and their Habits." By William Whyte. (See *Transactions*, Vol. III., Part V., page 238.)

2. "A Popular Description of some Characteristic Groups of Indian Birds." By Atholl MacGregor. The paper was illustrated by a large number of preserved specimens.

PHOTOGRAPHIC SECTION.

27th November, 1902.

HENRY COATES, F.R.S.E., President, in the Chair.

In reply to a letter from Mr. Maclauchlan, Blairgowrie, Mr. Coates moved, and Mr. F. C. W. Thompson seconded, "That we agree to give our support to the Scheme of Affiliation of Scottish Photographic Societies." This was carried unanimously.

Mr. Agate showed a number of prints taken during a tour in Egypt and Palestine.

The President intimated that Mr. Agate had agreed to give a Lantern Lecture at the Photographic Convention, to be held in July next year in Perth.

Mr. Coates then gave his Lantern Lecture, "Snapshots in the Rocky Mountains." He showed a large number of interesting slides, and accompanied them with a commentary of photographic and general interest.

*The above notes were made, and the photographs taken, early in March, about five weeks after the date of the first flooding.—J. S. G.

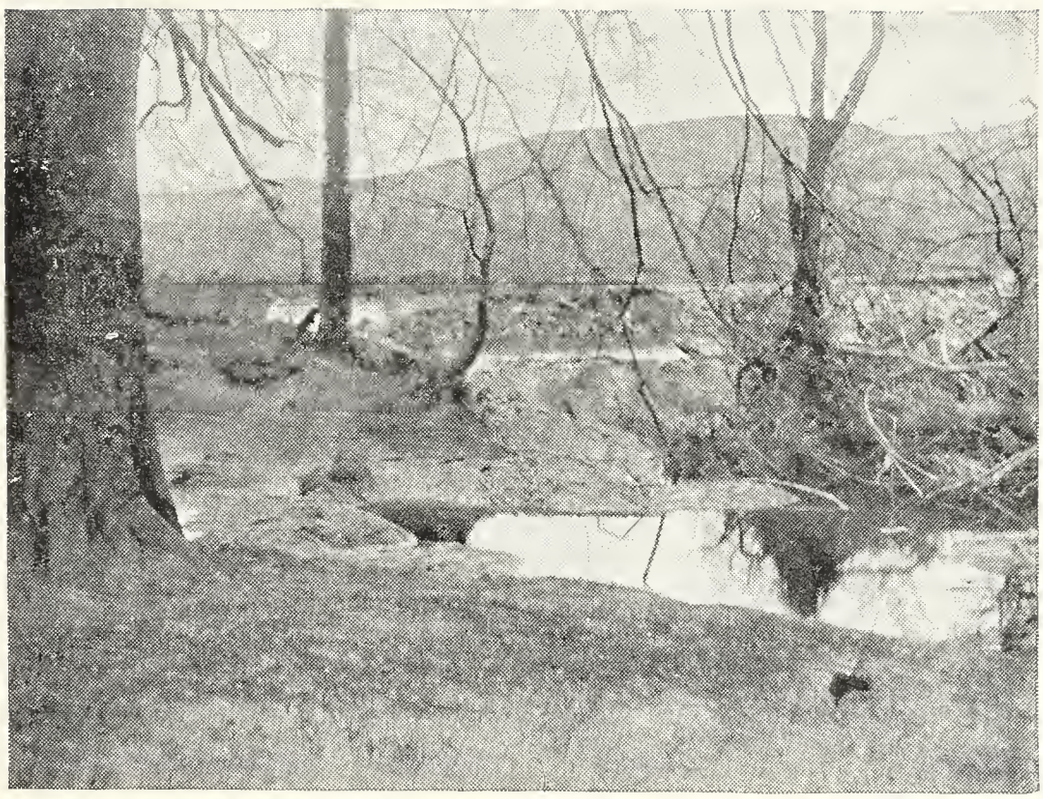


Plate 5.—Middle of break below Dalguise Bridge, showing accummulation of debris, also height of flood marked on tree in left foreground.

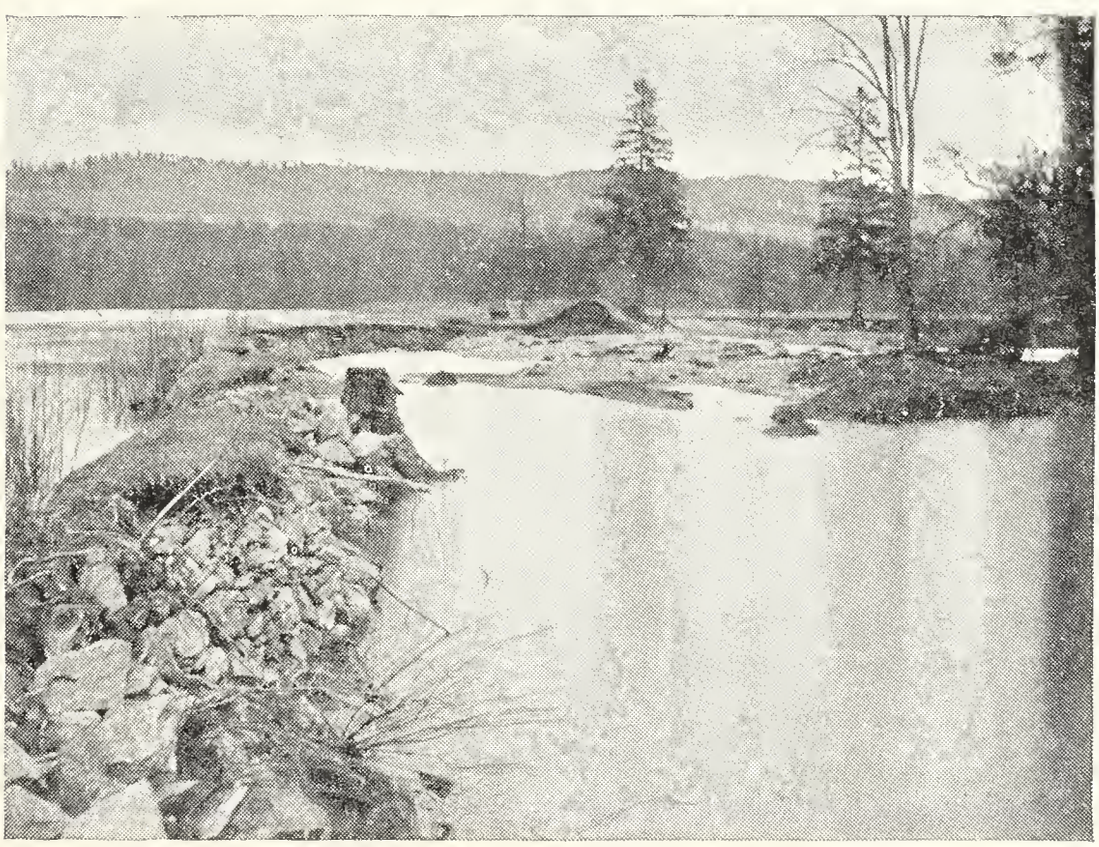


Plate 6.—Lower end of break below Dalguise Bridge, showing deep pool outside broken embankment.

18th December, 1902.

HENRY COATES, F.R.S.E., President, in the Chair.

An interesting description of a tour in Norway, accompanied by a series of lantern slides, was given by James Stewart, L.D.S.

22nd January, 1903.

HENRY COATES, F.R.S.E., President, in the Chair.

A large number of Lantern Slides, taken by Members, was exhibited; but it was agreed that it would be better if more of the Members would take an active interest in this branch of Photography.

The Secretary, as one of the delegates to a Meeting, held in our Rooms here, in connection with the proposed affiliation scheme, stated that a Committee had been appointed to draft rules, which were to be submitted to Societies, and afterwards discussed at a Meeting of Delegates, to be held in Perth in March.

26th February, 1903.

HENRY COATES, F.R.S.E., President, in the Chair.

A practical demonstration of the principles of Enlarging was given by the Secretary, who also replied to numerous questions put by Members present.

An account of the Photographic work would not be complete without some mention being made of the Photographic Convention, which is to be held in Perth in July of this year.

This is a meeting of Photographers, both Amateur and Professional, and also includes those who are in any way interested in Photography. It is held at various centres in the United Kingdom yearly, and the Perth Meeting will be the 18th Annual Meeting.

Sir Robert Pullar has consented to be President, succeeding Sir Robert Ball in that office, and an influential Reception Committee has been formed.

This is in itself a guarantee of success, but it does not release those in charge of local arrangements from doing their best. A strong Local Executive Committee, with Mr. Henry Coates as Chairman, has been formed, and things are looking bright for a successful meeting. Although Perth is near the centre of Scotland, still it is a long way from London, and as it is probable that some will be unable to come so far north as Perth, it is hoped that a large number of local members will join the Convention, and uphold the honour of our Fair City.

SUMMER SESSION, 1903.

The following Excursions were arranged :—

1. Saturday, 9th May.—The Dunfermline Naturalists' Society will visit the Museum and Kinnoull Hill.
   Leader—Mr. H. Coates.

2. Tuesday, 19th May.—The Natural History Society of Edinburgh, with Sir John Murray, will visit the Museum.

3. Monday, 1st June (Holiday).—Blairgowrie and Kirkmichael.
   Leader—Mr. W. D. M. Falconer.

4. Saturday, 20th June.—North Queensferry and Naval Base. (Jointly with the Dunfermline Naturalists' Society.)
   Leader—Rev. Alex. S. Wilson.

5. Saturday, 4th July (Holiday).—Mountain Excursion to Am Binnein, 3827 ft. Meeting of the Mountain Club at two o'clock.
   Leader—Mr. Meldrum.

6. Tuesday, 7th July.—Photographic Convention Excursion to Pitlochry and Pass of Killiecrankie.

7. Thursday, 9th July.—Photographic Convention Excursion to Dunkeld.

8. Friday, 10th July.—Photographic Convention Excursion to Blairgowrie.

9. Saturday, 11th July.—Photographic Convention Excursion to Stobhall, Scone Palace, &c.

10. Saturday, 25th July.—Invergowrie to Longforgan.
    Leader—Mr. Robert Dow.

11. Saturday, 8th August.—Loch of the Lowes.
    Leader—Mr. Charles M'Intosh.

12. Wednesday, 26th August (Holiday).—Wormit.
    Leader—Mr. G. F. Bates, B.A.

BALANCE-SHEET OF THE PERTHSHIRE SOCIETY OF NATURAL SCIENCE for the Year ended 28th February, 1903.

INCOME.

To Balance in Savings Bank, 28th February, 1902, ...	£11	10	3		
,, Balance in Treasurer's hands,	0	6	2		
				£11	16 5
,, Annual Subscriptions and Entrance Fees,				99	12 0
,, Contributions towards Coals and Gas, ...				1	16 0
,, Interest on Savings Bank Account, ...				0	5 5
				£113	9 10

EXPENDITURE.

By Feu Duty Duplicand and Property Tax,				£15	5 10
,, Fire Insurance, ...				7	0 0
,, Printing, Stationery, &c., ...				35	15 7
,, Books, Magazines, and Binding, ...				19	17 1
,, Rents, Coals, and Gas,...				17	2 0
,, Janitor, Proportion of Salary, ...				5	0 0
,, Subscription to other Societies, ...				1	1 0
,, Postages and Petty Outlays, ...				6	3 2
Year's Payments, ...				£107	4 8
Balance in Savings Bank, ...	£4	13	2		
,, in Treasurer's hands,	1	12	0		
				6	5 2
				£113	9 10

PERTH, 12th March, 1903.—We have examined the foregoing Accounts for the year, with the relative vouchers, and find them correct. The sum in Savings Bank at the close of the year is £4 13s 2d, and in Treasurer's hands £1 12s; total £6 5s 2d.

(Signed) JAMES MORISON
WILLIAM BARCLAY, } *Auditors.*

PERTHSHIRE SOCIETY OF NATURAL SCIENCE—MUSEUM FUND.

ABSTRACT OF ACCOUNTS, 1st March to 30th June, 1902.

INCOME.				EXPENDITURE.			
Balance at Credit of the Society, 1st March, 1902,	£4	11	6	Salaries to Curator and Janitor,	£55	0	0
Subscriptions,	82	0	0	Specimens and Mounting same,	11	19	2
Collected per Box in Museum,	1	0	0	Repairs,	5	6	2
				Furnishings,	1	19	2
				Petty Outlays,	3	3	9
				Balance at Credit, June, 1902,	10	3	3
	£87	11	6		£87	11	6

PERTH, 12th March, 1903.—Examined and found correct. WILLIAM BARCLAY, *Auditor.*

LIST OF DONATIONS TO THE MUSEUM AND LIBRARY,

Session 1902-3.

Geological Society, The Quarterly Journal of the, Nos. 229, 230, 231, 232, 233—The Society.

Carnegie Museum, Memoirs of the, Vol. I., No. 1.—The Museum.

Carnegie Museum, Annals of the, Vol. I., Nos. 1, 2—The Museum.

Carnegie Museum, Report of the, year ending March 31, 1901—The Museum.

Carnegie Museum, Prize Essay Contest, 1900—The Museum.

Lloyd Library of Botany, Pharmacy, and Materia Medica, Bulletin of the, Nos. 3, 4—The Library.

Lloyd Library, Mycological Notes—Nos. 1, 2, 3, 4, 5, 6, 7, 8, 9—The Library.

United States Department of Agriculture, Year Book of the, 1900—The Department.

American Museum of Natural History, Bulletin of the—The Museum.

American Museum of Natural History, List of Papers published in the Bulletin of the, 1881-1902, Vol. XI., Part IV.; Vol. XIV.; Vol. XV., Part I.; Vol. XVI.; Vol. XVII., Parts I., II.; Vol. XVIII.—The Museum.

Canada, Geological Survey of, Index to Reports, 1863-1884—The Department.

British Association Report, 1901, Glasgow—The Association.

Board of Agriculture, Leaflets, Nos. 61, 71, 72, 73, 74, 75, 76, 77, 78, 79—The Department.

Perth, Health Report for the City of, 1901—The Medical Officer of Health.

Mexico, Boletin del Instituto Geologico de, No. 15—The Department.

United States Geological Survey, Monographs, XLI.—The Department.

United States Geological Survey, 21st Annual Report, Parts II., III., IV., V., VIII.—The Department.

United States Geolcgical Survey, Bulletin, Nos. 177-190, 192-194—The Department.

United States, Mineral Resources, 1900—The Department.

Hand-List of Birds, Vol. III.—Trustees, British Museum.

Catalogue of Moths, Vol. III.—Trustees, British Museum.

Catalogue of Fossil Fishes, Part IV.—Trustees, British Museum.

Summer Birds of Flathead Lake, Bulletin of the University of Montana—The Directors.

Buchan Field Club, Transactions of the, Vol. VI., 1901—The Society.

Fishery Board for Scotland, 20th Annual Report, Part III., 1902—Fishery Board for Scotland.

Salmon Fisheries, Report on, 1901—Fishery Board for Scotland.

Northamptonshire Natural History Society, Journal of, Nos. 85, 86, 87, 88—The Society.

Royal Society, Edinburgh, Proceedings, Vol. XXIII., Nos. 3, 4, 5, 6; Vol. XXIV., No. 1—R. D. Pullar, Esq.

American Geological Railway Guide, An—H. Coates.

Grand Cañon, Tertiary History of the—H. Coates.

Grand Cañon, Atlas of the—H. Coates.

Tertiary Vertebrates, U.S.G.S., Vol. III.—H. Coates.

Academy of Natural Science, Philadelphia, Proceedings of, Vol. LIII., Part III.; Vol. LIV., Parts I., II.—The Academy.

American Museum of Natural History, The, Report, 1901—The Trustees.

Alaska, Reconnaissances in the Cape Nome and N. Bay Regions—U.S. Geological Department.
Copper River District, The Geological and Mineral Resources of a Portion of the—U.S. Geological Department.
Manchester Museum, Report, 1901-2—The Museum.
Manchester Museum, Notes from, Nos. 7, 8—The Museum.
Missouri Botanical Garden, 13th Report—The Trustees.
Southport Society of Natural Science, Reports, 1890-1892—The Society.
Photography for Novices—H. Coates.
Barnet Book of Photography—H. Coates.
Telford Book of Photography—Alex. M. Rodger.
Science and Art of Photography, an Introduction—Alex. M. Rodger.
Montevideo, Annales del Museo Nacional de, Part I., Transactions IV., 1902—The Directors.
Nature, Vols. LXIII., LXIV., LXV., LXVI.—R. Kidston, Esq., F.R.S.
Natural History Society of Glasgow, Transactions of, Vol. VI., Part II.—The Society.
Natural History and Archæological Society, Stirling, 1901-2—The Society.
Royal Physical Society, Proceedings, 1900-1—The Society.
Lower Strathspey, The Geology of—Geological Survey of Scotland.
Edinburgh Field Naturalists' and Microscopical Society, Transactions, 1901-2—The Society.
North American Fauna, No. 22—U.S. Department, Agriculture.
The Children's Museum, Bulletin, Nos. 1, 2, 3—The Brooklyn Institute of Arts and Science.
La Vegetation des Pays Illyriens—Mr. Hardy.
"Southern Cross" Reports—Trustees, British Museum.
Handbook of Instructions for Collectors—Trustees, British Museum.
Guide to Coral Gallery—Trustees, British Museum.
Westwood's Catalogue of the Phasmidæ (Plates)—Trustees, British Museum.
Insect Studies (6 Reprints)—Charles Janet.
Australian Museum, Report of the Trustees, 1901—The Trustees.
Smithsonian Institution, Annual Report, 1901—The Institute.
Entomologist, 1878-1902—S. T. Ellison.
Entomologist Record, 1890-1895—S. T. Ellison.
Photography, 1897-1901—S. T. Ellison.
Flora of Bournemouth—Arthur Bennett.
Nova Scotian Institute of Science, Proceedings and Transactions, Vol. X., Part III.—The Society.
Northumberland Sea Fisheries Committee, Report, 1902—The Editor.
Nottingham Naturalists' Society, Transactions and 15th Annual Report—The Society.
Nature Study Exhibition and Conferences, Official Report, 1902—H. Coates.

ROLL OF MEMBERSHIP, AS AT 9TH APRIL, 1903.

* Life Members.

HONORARY MEMBER.

Geikie, James, LL.D., F.R.S., etc., Professor of Geology, Edinburgh University, ...	2nd February, 1882

CORRESPONDING MEMBERS.

Brebner, James, M.A., Harris Academy, Dundee, ...	12th November, 1885
Ferguson, Rev. J., M.A., Fearn, Brechin, ...	5th November, 1874
Geddes, Patrick, F.R.S.E., University College, Dundee,	3rd February, 1881
Goodchild, J. G., F.G.S., F.L.S., etc., Science and Art Museum, Edinburgh, ...	20th December, 1897
Macnair, P., 70 Eastwood Avenue, Shawlands, Glasgow,	13th November, 1890
M'Gregor, T. M., Australia, ...	5th March, 1885
Mill, Dr. H. R., F.R.S.E., 109 Gloucester Place, Portman Square, London, ...	7th April, 1892
Ramsay, E. P., F.L.S., Curator of Australian Museum, Sydney, ...	7th February, 1884
Smith, Rev. Frederick, The Limes, Dunblane, ...	13th November, 1890
Thomson, Professor D'Arcy, C.B., University College, Dundee, ...	10th November, 1892
Trail, J. W. H., M.A., M.D., F.L.S., High Street, Old Aberdeen, ...	8th February, 1872
Wilson, Dr. Andrew, F.R.S.E., 110 Gilmore Place, Edinburgh, ...	4th January, 1883

ASSOCIATES.

Adams, Captain W., *S.S. Diana*, ...	14th March, 1901
Dewar, D., Remony, Kenmore, ...	5th February, 1885
Greig, Mr., Gamekeeper, Eastwood, Dunkeld, ...	14th April, 1898
Laidlaw, Mr., Gamekeeper, Castle Menzies, Glenlyon,	7th February, 1884
Milne, Captain W., *S.S. Eclipse*, ...	14th March, 1901
M'Intosh, Charles, Inver, Dunkeld, ...	1st May, 1873
Robertson, T., *S.S. Scotia*, ...	14th March, 1901

ORDINARY MEMBERS.

Adams, C. L., Solicitor, 80 Darlington Street, Wolverhampton, ...	11th April, 1901
Alexander, Charles, St. John's Place, ...	16th January, 1896
Alexander, John, M.A., Sharp's Institution, ...	14th December, 1893
Alexander, J., Seedsman, High Street, ...	6th April, 1897
Alexander, Rev. John, M.A., U.F. Manse, Pitcairngreen,	14th November, 1895
Allan, Thomas, Insurance Agent, St. John Street, ...	13th April, 1899
Allan, Wm. (Hay & Kyd), Victoria Street, ...	12th February, 1903
Anderson, Andrew, c/o P. D. Malloch, New Scott Street,	9th December, 1897
Asher, J., The Academy, ...	9th December, 1897

Barclay, William, Friar Street, Craigie, ...	1st February, 1883
Barclay, William A., Pitcullen Terrace, ...	9th December, 1897
Bates, G. F., B.A., ...	8th November, 1900
Beattie, Dr., Craigvar, Pitlochry, ...	9th December, 1897
Bedford, F. W., British Linen Bank, George Street, ...	13th December, 1894
Blair, Robert, New Scott Street, ...	11th December, 1902
Blair, Douglas, South Methven Street, ...	10th March, 1898
Bouick, James B., *Dundee Advertiser* Office, High Street,	14th February, 1895
Boyd, Rev. John, Menstrie, Glendevon, ...	13th April, 1899
Brady, George, 23 Melville Street, ...	11th April, 1895
Brady, John C., 23 Melville Street, ...	14th November, 1901
Brand, John, Upland, Kinnoull, ...	10th December, 1891
Brand, Robert, 7 Melville Street, ...	7th April, 1892
Breadalbane, Marquis of, Taymouth Castle, Aberfeldy,	7th April, 1892
Bridges, James, Tay Street, ...	1st February, 1883
Brough, Miss Elizabeth, Wilson Street, Craigie, ...	13th March, 1902
Brown, Alfred, Seedsman, High Street, ...	14th December, 1893
Brown, J. A. Harvie, F.Z.S., Dunipace House, Larbert,	10th December, 1891
Brown, Mrs., Laurel Bank, Barnhill, ...	9th May, 1889
Buchanan, T. R., M.P., 12 South Street, Park Lane, London, ...	12th March, 1903
Buchanan, Mrs., 12 South St., Park Lane, London, ...	12th March, 1903
Buhrer, Jean J., L. ès L., Balhousie Street, ...	8th November, 1900
Burnett, C., Craigmount, Barnhill, ...	22nd February, 1894
Buttar, Thomas, 8 Marshall Place, ...	8th March, 1894
Calman, W. T., D.Sc., British Museum, Cromwell Road,	11th April, 1894
Cameron, David, Commercial Street, Bridgend, ...	14th December, 1884
Campbell, Andrew B., 41 George Street, ...	12th April, 1900
Campbell, Archibald, Atholl Place, ...	8th November, 1900
Campbell, Col., Governor, General Prison, Edinburgh,	18th January, 1884
Campbell, Edward, Lignwood, New Scone, ...	11th April, 1889
Campbell, Lieut., King's Barracks, ...	12th March, 1903
Campbell, Peter, Lignwood, New Scone, ...	4th April, 1878
Campbell, P. W., Muirton Bank, ...	9th March, 1899
Campbell, Miss., Muirton Bank, ...	8th November, 1900
Carruthers, Dr., 12 Rose Terrace, ...	12th January, 1893
Carver, E. J., 12 Bath Street, Glasgow, ...	13th March, 1902
Chalmers, James, Laurel Bank, Bridgend, ...	7th April, 1892
Chalmers, Thomas, Solicitor, 42 Tay Street, ...	23rd November, 1883
Chapman, Samuel, King James Place, ...	16th January, 1896
Christie, James, 8 Paul Street, ...	11th April, 1895
Chrystal, George, St. John's Foundry, ...	2nd December, 1880
Clacher, James, 9 George Crescent, ...	3rd April, 1879
Clark, Rev. P. A. Gordon, West U.F. Manse, Kinnoull,	14th December, 1893
Clark, Miss Nellie, Kinnoull Public School, ...	12th December, 1901
Coates, Henry, F.R.S.E., Pitcullen House, ...	6th May, 1875
Coates, James, Pitcullen House, ...	6th May, 1875
Coates, Miss, Pitcullen House, ...	3rd January, 1878
Coates, Mrs., Pitcullen House, ...	8th January, 1880
Coats, Miss M. M., Staneley, Paisley, ...	13th March, 1902
Coats, Archibald, Battleby, Redgorton, ...	14th December, 1899
Coats, Mrs. W. H., Battleby, Redgorton, ...	14th December, 1899

*Colquhoun, Col., Clathick, Crieff, ... 5th December, 1878
Constable, A. H. B., Advocate, Edinburgh, ... 11th April, 1901
Cox, Mrs., Glendoick, Glencarse, ... 14th November, 1895
Cox, W. H., Snaigow, Dunkeld, ... 8th December, 1898
Craigie, James, Sandeman Public Library, ... 12th March, 1903
Crawford, Rev. T., B.D., Balnacraig, Barnhill, .. 7th April, 1892
Crawford, Thomas, High Street, ... 10th January, 1889

Davidson, Alex., Water Manager, Glasgow Road, ... 2nd March, 1882
Davie, Miss, Westfield, Glasgow Road, ... 13th December, 1900
Deas, John B., Rosemount Place, ... 1st September, 1870
Deas, Miss, Rosemount Place, ... 16th January, 1896
Dewar, James, Kincarrathie Crescent, ... 16th January, 1896
Dewar, Mrs. James, Kincarrathie Crescent, ... 9th March, 1899
Dewar, John A., M.P., Murrayshall, ... 7th February, 1878
Dewar, John, jun., Murrayshall, ... 9th December, 1897
Dickson, Miss, Greenbank, ... 2nd February, 1882
Dickson, Miss M. G., Greenbank, ... 9th April, 1896
Dobbie, J. B., Royal Bank of Scotland, 2 Hailes Street, Edinburgh, ... 13th February, 1890
Dodson, Charles, 29 Queen Street, Craigie, ... 12th April, 1900
Donald, D., 30 Shields' Buildings, Dunkeld Road, ... 11th December, 1902
Douglas, Henry, City Chamberlain's Office, ... 11th January, 1900
Dow, Robert, Schoolhouse, Longforgan, ... 4th May, 1882
Dow, Thomas, Jeanfield, ... 14th March, 1901
Drummond, Col. H. S. Home, Blairdrummond, ... 9th March, 1899
Drummond, The Hon. Mrs., Megginch, ... 13th March, 1902
*Drummond, Miss Sybil, 15 Grosvenor Crescent, London, ... 12th December, 1901
Duff, L. H., Fechney Industrial School, ... 13th November, 1902
Duncan, G. Smith, Law Park, Blairgowrie, ... 3rd December, 1885
Duthie, Lieut.-Col., The Presbytery, North Berwick, ... 10th December, 1891

Ellison, Samuel T., Bonavista, Glasgow Road, ... 7th March, 1878
Ellison, William, 2 Balhousie Street, ... 3rd March, 1881
Evans, Miss Z. E., Balhousie Street, ... 10th December, 1895
Evans, W., 38 Morningside Park, Edinburgh, ... 12th January, 1899
Ewing, Robert, Queen Street, Craigie, ... 8th December, 1892

Fairweather, John, Kinnaird Schoolhouse, ... 13th March, 1902
Fairweather, Mrs., Kinnaird Schoolhouse, ... 13th March, 1902
Falconer, William D. M., James Street Cottage, Blairgowrie, 9th March, 1899
Farquhar, Rev. Canon, Balhousie Street, ... 8th December, 1887
Farquharson, William, Nurseryman, Bridgend, ... 4th December, 1884
Fehrenbach, G. W., Watchmaker, Dunkeld, ... 7th February, 1884
Fenwick, F., Pitcullen Terrace, ... 8th December, 1898
Ferguson, Archibald M., Pitcullen Terrace, ... 8th November, 1900
Ferguson, James, M.B., C.M., 5 Charlotte Street, ... 3rd May, 1883
Ferguson, Rev. J., M.A., B.D., Manse, Aberdalgie, ... 5th January, 1882
Ferguson, R. C., Ferndale, Barnhill, ... 11th April, 1889
Ferrier, D., Edina Villa, Edinburgh Road, ... 10th December, 1891
Forbes, A. Drummond, J.P., Millearn, Auchterarder, ... 12th March, 1903
Forbes, Miss, 23 North Methven Street, ... 3rd May, 1883
Forbes, Miss Alice, Larchwood, Pitlochry, ... 9th February, 1899

Fraser, John, 242 South Street, ... 8th November, 1900
Frew, Thomas, King James Place, Perth, ... 16th January, 1896

Gall, Miss, 8 Glover Street, ... 14th November, 1895
Garvie, William, Hay Street, Balhousie, ... 7th February, 1884
Gloag, Robert, Cherrybank, ... 13th December, 1894
Gold, Miss Hannah, LL.A., Airlie Villa, Alyth, ... 6th March, 1897
Graham, Dr., Dunalastair,... ... ... 10th December, 1891
Grant, John S., Ballinluig,... ... ... 13th December, 1894
Gray, George, Bowerswell, ... 2nd February, 1882
Gray, J., Rockland Villa, Craigie, ... 13th December, 1900

Halley, Robert, Barossa Place, ... 16th January, 1896
Harker, Mrs., Illingford, Thetford, Norfolk, ... 14th December, 1899
*Hay, Lieut.-Col. Drummond, Seggieden, ... 14th January, 1897
Hay, Miss Drummond, Seggieden, ... 14th December, 1899
Henderson, J., 26 Princes Street, ... 9th December, 1898
Hodge, A., 10 Balhousie Street, ... 11th April, 1889
Holloway, R., Rockland Villa, 2 Queen Street, ... 8th December, 1898
Humble, Miss Eleanor W., 32 Balhousie Street, ... 10th December, 1896
Hunt, Dr. Leigh, King Street, ... 2nd February, 1882
Hunter, Patrick, Waterybutts, Errol, ... 22nd February, 1894
Hutcheson, Andrew, Beechwood, ... 11th April, 1895
Hutcheson, Mrs., Beechwood, ... 11th April, 1901

Jameson, A., Sheriff of Perthshire, 14 Moray Place, Edinburgh,... ... ... 7th April, 1892
Jameson, Harry, Claremount, Kinnoull, ... 14th November, 1895
Jameson, Melville, jun., Fernhill, Kinnoull, ... 7th January, 1869
Jamieson, Alex., Balhousie Street, ... 5th January, 1882
Jamieson, Miss V., Barossa Place, ... 3rd January, 1878
Jardine, Mrs., 2 Main Street, ... 14th November, 1895

Kaye, William, Craigie Public School, ... 12th April, 1900
Kaye, Thomas, Westerfield, Viewlands Road, ... 13th March, 1902
Keay, John, 6 Spens Crescent, ... 8th November, 1900
Kenna, Miss, Matilda, Paradise Place, ... 12th April, 1900
Kenna, Miss Maggie, Paradise Place, ... 12th April, 1900
Kennedy, James, Teacher, Ballinluig, ... 1st May, 1884
Kidston, R., F.R.S., F.G.S., 12 Clarendon Place, Stirling, ... 4th December, 1884
King, Mrs., 2 Blackfriars Street, ... 11th April, 1901
Kinloch, R., W.S., Clydesdale Bank, ... 18th December, 1890
Kinloch, Sir John, Bart., Kinloch, Meigle, ... 7th April, 1892
Kinnaird, James, Birnam, ... 12th January, 1899
Kippen, R. M., Solicitor, Tay Street, ... 2nd March, 1882
Knight, Rev. G. A. F., M.A., F.R.S.E., Auchterarder, 14th November, 1901

Laidlaw, T. G., M.B.O.U., Bank of Scotland, Perth,... 11th December, 1902
Laing, W. H., Bridge of Earn, ... 13th April, 1899
Landreth, Rev. P. R., Pedwarden Road, ... 12th January, 1899
Large, Mrs., Clydesdale Bank House, ... 11th December, 1902
Law, Charles, Princes Street, ... 7th February, 1884
Lawson, Robert, 7 Princes Street, ... 11th April, 1895

Leslie, J., Pitcullen Lodge, ... 7th April, 1892
Leslie, Hugh, Kinnoull Public School, ... 12th April, 1900
Lorimer, G., Tay Street, ... 10th January, 1895
Love, Lord Provost, St. John's Place, ... 4th May, 1882
Lowe, Miss, Tay Street, ... 12th April, 1902
Lowe, William, Bon-Accord Villa, Balhousie Street, ... 14th April, 1898
Lowson, D. S., M.A., The Pines, Balhousie, ... 1st April, 1886
Lyell, John, M.D., 15 Marshall Place, ... 13th December, 190

Malcolm, J. Buttar, Auchterarder Castle, ... 13th April, 1899
Malloch, Gilbert, Almond Villa, Glasgow Road, ... 16th January, 1896
Malloch, P. D., Almond Villa, Glasgow Road, ... 2nd December, 1870
*Mansfield, The Right Hon. The Earl of, Scone Palace, 9th March, 1896
Manuel, Rev. D. G., B.D., Balhousie Terrace, ... 14th December, 1899
Marshall, D., Tay Street, ... 7th January, 1869
Marshall, Thomas, The Store, Stanley, ... 1st October, 1868
Martin, Andrew, Mount Tabor, Kinnoull, ... 4th December, 1884
Martin, David, 3 Strathearn Terrace, ... 14th March, 1901
Martin, George, 4 Strathearn Terrace, Glasgow Road, 16th January, 1896
Masterson, J., 28 Mill Street, ... 10th December, 1894
Meldrum, R. H., Schoolhouse, Tibbermore, ... 1st May, 1884
Menzies, Dr. Alex., Webster's Seminary, Kirriemuir, ... 7th December, 1882
Menzies, James, 71 Strathmore Street, ... 12th March, 1896
Mercer, Miss, Locke's Acre, Crieff, ... 3rd March, 1884
Mercer, Miss Louisa, Kingarth, Crieff, ... 3rd March, 1884
Mercer, W., Princes Street, ... 8th January, 1899
Miles, Miss M. L., LL.A., 2 Laurel Bank, ... 14th December, 1899
Millais, Geoffrey, Bowerswell, ... 14th April, 1898
Millais, Sir J., Bart., 38 Lower Belgrave Street, Eaton Square, London, ... 13th March, 1902
Miller, Alex., Osborne Terrace, Craigie, ... 14th November, 1895
Miller, F. Norie, Cleeve, ... 8th December, 1892
Miller, Mrs. F. Norie, Cleeve, ... 10th January, 1895
Miller, George A., W.S., Knowehead, ... 2nd December, 1886
Miller, J. G., Solicitor, Blackfriars Street, ... 23rd March, 1893
Miller, William, 9 Rose Terrace, ... 7th February, 1884
Milln, D. N., County Place, ... 16th January, 1896
Minto, John, M.A., Brighton Public Library, ... 6th April, 1897
Moffat, Thomas, Teacher, Forgandenny, ... 14th November, 1895
Moncreiffe, Sir R. D., Bart., Moncreiffe House, Bridge of Earn, ... 17th May, 1874
*Moncrieff, Sir A., F.R.S., Bandirran, ... 9th February, 1893
Moncrieff, Thomas, 7 Leonard Street, ... 2nd February, 1882
Moncrieff, Thomas, Springland, ... 5th March, 1885
Morison, J. Brown, F.R.S.E., Murie, Errol, ... 4th April, 1878
Morison, James, Hasland, Kinnoull, ... 7th February, 1884
Morison, Miss, Hasland, Kinnoull, ... 13th February, 1890
Morison, W., Gowrie Street, Bridgend, ... 16th January, 1896
Morrison, David, St. Catherine's Place, ... 5th December, 1878
Muirhead, George, Muirhall Terrace, ... 14th November, 1895
Munro, John, Charlotte Street, ... 12th March, 1896
Murray, A., Scone, ... 11th December, 1902
Murray, David, 3 Craigie Crescent, ... 11th December, 1902

Murray, D. Scott, Laurel Bank, ...	14th March, 1901
Murray, Miss Gladys Graham, Stenton, Dunkeld, ..	8th January, 1899
M'Ainsh, Rev. John, B.D., U.F. Manse, Strathbraan, Dunkeld, ...	12th January, 1899
M'Alpine, W., 83 Glover Street, ...	8th December, 1898
M'Arthur, John, 120 High Street, ...	7th February, 1884
M'Aulay, Mrs., King's Place, ...	14th November, 1901
M'Donald, A. Burns, Earnoch, ...	14th March, 1895
M'Donald, Miss, Atholl Place, ...	8th December, 1892
M'Donald, Miss Barbara, Castleview, Glasgow Road, ...	11th February, 1897
M'Donald, Miss Flora, Woodlands,...	8th November, 1900
M'Donald, Miss Ida, Woodlands, ...	8th November, 1900
M'Duff, A., Bonhard, ...	3rd December, 1885
M'Duff, Mrs., Bonhard, ...	23rd November, 1883
M'Ewen, James, Craigie Bank, ...	7th April, 1892
M'Farlane, Miss, 2 King's Place, ...	8th November, 1900
M'Gregor, Atholl, Ardchoille, ...	7th December, 1882
M'Gregor, Mrs. Atholl, Ardchoille,...	9th January, 1902
M'Gregor, David, Woodside House, Balhousie, ...	2nd March, 1882
M'Gregor, John, 15 Brownsville Road, Heaton Moor, Stockport, ...	2nd March, 1871
M'Gregor, John, 30 North Methven Street, ...	4th March, 1886
M'Gregor, Miss Murray, Barossa Place, ...	9th March, 1899
M'Gregor, Peter, National Bank, ...	5th March, 1885
M'Kay, A. T., Barossa Place, ...	9th April, 1903
M'Kendrick, Andrew, Livadia, Greece, ...	9th April, 1896
M'Kenzie, Alex., Bowerswell Cottage, ...	14th April, 1898
M'Kenzie, George A., Solicitor, George Street, ...	12th April, 1870
M'Kenzie, Sir Alexander Muir, Bart., Delvine, ...	14th November, 1901
M'Kinnon, John, Pitcullen Crescent, ...	22nd February, 1894
M'Laren, William, Architect, ...	7th February, 1878
M'Leish, James, Mill Street, ...	4th April, 1878
M'Leod, Miss, 3 Fairmount Villas, ...	10th February, 1898
M'Nab, Miss, L.L.A., Fitzroy Terrace, ...	14th November, 1895
M'Naughton, Dr. John, General Prison, ...	4th April, 1880
M'Naughton, Miss Eliza, Barossa Place, ...	9th March, 1888
M'Naughton, Miss, Barossa Place, ...	9th March, 1888
M'Naughton, Dr. W. A., Medical Officer of Health, Stonehaven, ...	14th December, 1899
M'Neill, John, Balhousie, ...	2nd March, 1871
M'Quibban, William, Marshall Place, ...	14th December, 1893
Nairne, William, Caledonian Road Public School, ...	12th March, 1902
Newlands, Miss Helen, Tayside, ...	10th January, 1901
Nicoll, Edward, Atholl Street, ...	10th December, 1891
Nicoll, A., Atholl Street, ...	12th November, 1895
Ogilvie, James, Brewer, Blairgowrie, ...	7th February, 1884
Oswald, Rev. Robert, B.D., Freston, Glasgow Road, ...	13th April, 1899
Pagan, Miss M. A., Rockclyffe, Crieff, ...	14th April, 1898
Parker, Charles S., Fairlie, Largs, ...	7th December, 1871
Paterson, William, 3 Salisbury Terrace, Cherrybank, ...	14th December, 1899
Paton, Dr., Atholl Place, ...	14th November, 1895

Peddie, D., Ironmonger, Market Street, ... 1st May, 1873
Peddie, R., Victoria Street, ... 8th December, 1898
Peebles, George, 81 High Street, ... 13th December, 1900
Phillips, Miss, 52 Tay Street,... ... ... 18th January, 1884
Pinkerton, Miss Anne, Kincarrathie Crescent, ... 9th December, 1897
Pitcaithly, Alex., Jeaniebank, Old Scone, ... 10th February, 1898
Proudfoot, James, 24 Melville Street, ... 5th March, 1885
Pullar, A. E., Durn, ... 23rd November, 1883
Pullar, Mrs. A. E., Durn, ... 7th April, 1892
Pullar, James F., Dunbarney Cottage, ... 5th December, 1872
Pullar, Herbert, Rosebank, ... 5th May, 1887
Pullar, Mrs., J. F., Rosebank, ... 5th May, 1887
Pullar, Rufus D., F.C.S., Brahan, ... 6th May, 1875
Pullar, Mrs. R. D., Brahan, ... 3rd March, 1887
Pullar, Sir Robert, Tayside, ... 2nd March, 1871
Pullar, Lady, Tayside, ... 14th April, 1881

Raffan, Miss Eliza, L.L.A., The Academy, ... 8th November, 1900
Ramsay, James, Balhousie Castle, ... 13th December, 1894
Readdie, David, St. Leonard's Bank, ... 8th December, 1898
Reid, Arthur S., M.A., F.G.S., &c., Trinity College, Glenalmond,... ... ... 10th December, 1891
Reid, Walter, Auchterarder House, Auchterarder, ...
Riach, Miss, 3 Mansfield Place, ... 3rd January, 1878
Riach, T. G., 3 Mansfield Place, ... 12th April, 1894
Richardson, James, 27 High Street, Blairgowrie, ... 14th March, 1901
Ridley, Miss, Tayside, ... 9th Jaunary, 1902
Ritchie, J., LL.B., Solicitor, Tay Street, ... 12th January, 1893
Ritchie, Mrs., Rosemount Place, ... 10th January, 1895
Ritchie, Miss, Moncreiffe Terrace, Craigie, ... 14th November, 1895
Robertson, Charles, 94 High Street, ... 14th April, 1878
Robertson, Dr. Robert, Errol, ... 2nd May, 1867
Robertson, Miss Isabella, 2 Blackfriars Street, ... 11th April, 1891
Robertson, James, Mansfield Place,... ... ... 14th December, 1893
Robertson, James, 29 Pomarium, ... 12th March, 1903
Robertson, John, 6 Croft Bank, Craigie, ... 12th January, 1899
Robertson, John A., Solicitor, Tay Street, ... 7th February, 1884
Robertson, Miss, Springbank, ... 3rd January, 1878
Robertson, Robert, Blairgowrie, ... 4th January, 1877
Robertson, Robert Hay, 22 High Street, ... 2nd March, 1882
Robertson, William, 24 Canal Street, ... 8th December, 1898
Robson, Rev. George, D.D., Garry Lodge, ... 13th January, 1898
Rodger, Alex. M., Tay Street, ... 14th February, 1895
Rorie, George, C.A., 16 High Street, ... 9th March, 1899
Rorison, Very Rev. Dean, D.D., The Deanery, Kinnoull, 18th December, 1890
Roy, Mrs., Springbank, ... 3rd January, 1878
Russell, David, Brae Lodge, Murrayfield, Edinburgh, ... 8th February, 1900
Rutherford, W., Pitcullen Terrace, ... 5th March, 1885

Sadler, W. W., General Accident Assurance Office, ... 9th March, 1899
Scott, Miss Ina, Dunnottar, Crieff Road, ... 8th March, 1900
Scott, John, Governor, General Prison, ... 9th April, 1903
Scott, William M., 8 Hill Street, Coupar-Angus, ... 14th November, 1901

Sellar, James T., The Den, ... 1st March, 1883
Shepherd, Miss M., Queen Street, ... 8th November, 1900
Shields, H., Manufacturer, Eden Kerry, Tighnabruaich, 12th January, 1899
Sievwright, Sir James, K.C.M.G., Tulliallan Castle, Clackmannan, ... 8th November, 1900
Sim, D., Co-operative Buildings, Abbot Street, ... 8th December, 1898
Sime, John, Garfield, Glasgow Road, ... 12th April, 1893
Simpson, William, The Lodge, Balhousie Works, ... 14th November, 1895
Smart, David, Kinnoull, ... 2nd May, 1878
Smart, Miss, Kinnoull, ... 10th January, 1895
Smart, Edward, B.A., B.Sc., The Academy,... ... 14th November, 1895
Smith, Alexander, Corsiehill, ... 10th January, 1901
Smith, F. H., 23 Kestrel Avenue, Herne Hill, London, S.E., ... 14th November, 1901
Smith, J. C., M.A., H.M.I.S., ... 11th December, 1902
Smith, Rev. Harry, M.A., Tibbermore Manse, ... 13th February, 1896
Smythe, Col. D. M., Methven Castle, ... 13th April, 1882
*Somerville, Rev. J., B.D.—summer address, Castellar, Crieff; winter address, Villa Isaune, Mentone, ... 10th December, 1896
Spence, Thomas, St. Margaret's Cottage, Craigie Road, 13th March, 1902
Steel, Adam, Blackpark, ... 14th February, 1895
Steel, J. Sidney, Rosemount Place, ... 12th April, 1894
Stewart, C. Parker, M.B., C.M., B.Sc., 21 Marshall Place, ... 8th November, 1900
Stewart, James, 19 Princes Street, ... 5th January, 1882
Stewart, John A., Solicitor, Bonafassi, ... 8th November, 1900
Stewart, John, M.A., High School, Falkirk, ... 9th May, 1889
Stewart, Robert, St. John Street, ... 12th January, 1899
Stewart, J., 2 Main Street, ... 8th December, 1898
Stirling, David H., M.D., Riversdale, ... 4th April, 1880
Stirling, James, Riversdale, ... 13th October, 1902
Stirling, Dr. Robert, Atholl Place, ... 13th February, 1890
Sutherland, Donald, M.A., Schoolhouse, Scone, ... 11th December, 1902
Sym, John David, Sheriff-Substitute, Balboughty, ... 14th November, 1901
Syme, A. B., Muirton Bank, ... 7th February, 1884
Syme, Bruce, Muirton Bank, ... 13th December, 1900

Tait, Mrs., Manse, St. Madoes, ... 3rd December, 1885
Tait, Rev. Walter, Manse, St. Madoes, ... 3rd May, 1877
Taylor, David, 40 Balhousie Street, ... 9th February, 1893
Thomas, John, Barossa Place, ... 3rd November, 1870
Thomas, Miss, L.L.A., Barossa Place, ... 2nd December, 1886
Thompson, F. C. W., 6 North William Street, ... 13th December, 1900
Thomson, Dr. Andrew, M.A., F.R.S.E., &c., Ardenlea, Pitcullen, ... 13th November, 1890
Thomson, Mrs., Ardenlea, Pitcullen, ... 12th December, 1902
Thomson, Miss, Ardenlea, Pitcullen, ... 12th December, 1902
Thomson, James, Wellbank, Kinnoull, ... 23rd November, 1883
Thomson, J. L., Sculptor, 64 Princes Street, ... 14th April, 1898
Thomson, R. Gloag, Wellbank, Kinnoull, ... 12th December, 1901
Todd, Thomas, Glover Street, ... 14th April, 1898
Trotter, Dr., Tay Street, ... 4th May, 1882
Trotter, Dr. R. S., Tay Street, ... 3rd March, 1884

Tuke, Alfred, Station Hotel, ...	16th January, 1896
Turpie, James, Deputy Town-Clerk, ...	8th February, 1900
Urquhart, Dr., Murray House, ...	14th May, 1882
Urquhart, James David, 47 Balhousie Street, ...	12th January, 1899
Walker, Dugald, Balhousie Public School, ...	9th January, 1902
Wallace, Miss, Knowehead, ...	7th April, 1892
Wallace, Robert, K.C., M.P., 2 Garden Court, The Temple, London, ...	14th November, 1895
Watson, Miss, Inchyra, ...	13th December, 1894
Watson, W., Plumber, Mill Street, ...	10th January, 1895
Westwood, Alex., Princes Street, ...	5th January, 1882
White, Frank H. Buchanan, Annat Lodge, ...	4th February, 1886
White, T. Clement C. Buchanan, Annat Lodge, ...	14th November, 1895
White, Miss Gladys, Annat Lodge, ...	13th February, 1896
White, J. Martin, Balruddery, near Dundee, ...	2nd March, 1882
Wilson, D. J., Bank of Scotland, St. John Street, ...	13th December, 1894
Wilson, Mrs. D. J., Bank of Scotland, St. John Street,	9th March, 1899
Wilson, John, Arngask Schoolhouse, Glenfarg, ...	1st April, 1886
Wingate, A. K. P., Underwood, Perth Road, Crieff, ...	8th February, 1900
Winter, James, Norma Villa, Wilson Street, ...	12th January, 1893
Winter, John, 35 George Street, ...	2nd July, 1868
Winton, William, 53 Longcauseway, ...	11th February, 1898
Wood, C. L., Freeland House, Forgandenny, ...	15th May, 1880
Wood, John, jun., Dupplin Bank, Kinnoull, ...	11th April, 1889
Wright, Alex., 48 Scott Street, ...	13th December, 1894
Wright, Robert, Balhousie Street, ...	4th March, 1886
Young, Rev. D. G., B.D., Moneydie, ...	14th November, 1901
Young, George P. K., Tay Street, ...	2nd May, 1872
Young, James M., Printer, Watergate, ...	8th November, 1894
Young, W. Cochrane, Solicitor, St. John Street, ...	7th December, 1882

ASSOCIATE MEMBERS.

Campbell, R., The Lodge, Durn, ...	11th February, 1897
Cumming, A. G., Stationer, 153 High Street, ...	12th March, 1896
Neff, Jacob, Ballantine Place, Dunkeld Road, ...	14th April, 1898
Nelson, David, 54 Scott Street, ...	12th March, 1896
Rattray, J. P., Whitefriars Street, Dovecotland, ...	14th April, 1898
White, William, 29 Kirkgate, ...	14th November, 1895
Wylie, William, 17 Commercial Street, Bridgend, ...	12th March, 1896
Young, Thomas, Murray Street, ...	14th April, 1898

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